U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

September 22, 1987 Volume 1082 Number 4

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1082 OG 32
Notice of Maintenance Fees Payable	1082 OG 32
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1082 OG 33
Notification of Acceptance of Delayed Payment of Maintenance Fee	1082 OG 34
Reissue Applications Filed	1082 OG 34
Requests for Reexaminations Filed	1082 OG 35
Service by Publication	1082 OG 35
Patent Certificates of Correction	1082 OG 36
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1082 OG 37
Condition of Patent Applications	1082 OG 38
Reexaminations	1671
Reissue Patents Granted (32,506)	1673
Plant Patents Granted (6,017)	1675
Patents Granted	
General and Mechanical (4,694,505)	1677
Chemical (4,695,284)	1957
Electrical (4,695,674)	2071
Design Patents Granted (291,940)	2209
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design and Plant Patentees	PI 61
Classification of	
Patents (Including Reissues and Reexaminations)	PI 65
Designs and Plants	PI 68
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 69
Designs and Plants	PI 70
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on September 18, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,471,495 through 4,472,834
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 5, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,390,995	06/354,169	7/5/83
4,390,998	06/269,227	7/5/83
4,391,003	06/351,666	7/5/83
4,391,008	06/243,844	7/5/83
4,391,019	06/239,147	7/5/83
4,391,021	06/313,318	7/5/83
4,391,030	06/278,041	7/5/83
4,391,042	06/274,748	7/5/83
4,391,043	06/314,589	7/5/83
4,391,050	06/259,347	7/5/83
4,391,058	06/224,183	7/5/83
4,391,059	06/253,065	7/5/83
4,391,061	06/333,580	7/5/83
4,391,063	06/275,858	7/5/83
4,391,064	06/220,463	7/5/83
4,391,068	06/257,394	7/5/83
4,391,070	06/239,116	7/5/83
4,391,087	06/254,764	7/5/83
4,391,088	06/339,082	7/5/83
4,391,090	06/308,969	7/5/83
4,391,094	06/225,607	7/5/83
4,391,105	06/244,472	7/5/83
4,391,107	06/265,936	7/5/83
4,391,109	06/235,478	7/5/83
4,391,113	06/289,507	7/5/83
4,391,121	06/263,380	7/5/83
4,391,129	06/246,774	7/5/83
4,391,138	06/272,990	7/5/83
4,391,149	06/263,473	7/5/83
4,391,150	06/216,667	7/5/83
4,391,152	06/267,856	7/5/83
4,391,155	06/393,100	7/5/83
4,391,178	06/243,287	7/5/83
4,391,185	06/356,671	7/5/83
4,391,189	06/246,150	7/5/83
4,391,194	06/259,181	7/5/83
4,391,196	06/255,906	7/5/83
4,391,201	06/302,703	7/5/83
4,391,203	06/243,910	7/5/83
4,391,205	06/231,947	7/5/83
4,391,223	06/400,345	7/5/83
4,391,230	06/242,021	7/5/83
4,391,232	06/247,317	7/5/83
4,391,233	06/250,874	7/5/83
4,391,235	06/267,797	7/5/83
4,391,245	06/312,392	7/5/83
4,391,252	06/270,210	7/5/83
4,391,264	06/236,660	7/5/83
4,391,268	06/238,108	7/5/83
4,391,269	06/305,970	7/5/83
4,391,271	06/251,358	7/5/83
4,391,277	06/238,880	7/5/83
4,391,280	06/326,015	7/5/83
4,391,284	06/354,387	7/5/83
4,391,291	06/237,757	7/5/83
4,391,295	06/330,263	7/5/83
4,391,296	06/261,458	7/5/83
4,391,311	06/244,251	7/5/83
4,391,313	06/416,153	7/5/83
4,391,315	06/282,505	7/5/83
4,391,327	06/262,575	7/5/83
4,391,328	06/265,716	7/5/83
4,391,332	06/264,951	7/5/83
4,391,337	06/248,322	7/5/83
4,391,345	06/234,353	7/5/83
4,391,348	06/302,843	7/5/83
4,391,368	06/252,301	7/5/83
4,391,371	06/377,695	7/5/83
4,391,375	06/257,908	7/5/83
4,391,376	06/216,620	7/5/83
4,391,378	06/310,218	7/5/83
4,391,380	06/233,879	7/5/83
4,391,400	06/259,642	7/5/83
4,391,405	06/314,262	7/5/83
4,391,406	06/337,701	7/5/83
4,391,407	06/265,843	7/5/83
4,391,411	06/217,679	7/5/83
4,391,416	06/243,602	7/5/83
4,391,421	06/242,535	7/5/83
4,391,422	06/251,257	7/5/83
4,391,429	06/299,799	7/5/83
4,391,432	06/259,521	7/5/83
4,391,433	06/386,954	7/5/83
4,391,445	06/235,528	7/5/83
4,391,448	06/226,431	7/5/83
4,391,449	06/271,626	7/5/83
4,391,457	06/289,470	7/5/83

Patent Number	Serial Number	Issue Date
4,391,463	06/269,948	7/5/83
4,391,479	06/252,429	7/5/83
4,391,481	06/249,198	7/5/83
4,391,501	06/299,455	7/5/83
4,391,503	06/247,309	7/5/83
4,391,508	06/329,980	7/5/83
4,391,515	06/261,341	7/5/83
4,391,538	06/285,299	7/5/83
4,391,546	06/223,004	7/5/83
4,391,561	06/343,688	7/5/83
4,391,563	06/297,890	7/5/83
4,391,565	06/266,493	7/5/83
4,391,568	06/238,011	7/5/83
4,391,570	06/258,669	7/5/83
4,391,576	06/334,766	7/5/83
4,391,577	06/347,036	7/5/83
4,391,582	06/248,909	7/5/83
4,391,584	06/301,438	7/5/83
4,391,601	06/328,070	7/5/83
4,391,604	06/313,353	7/5/83
4,391,606	06/292,860	7/5/83
4,391,610	06/338,196	7/5/83
4,391,613	06/322,358	7/5/83
4,391,623	06/257,403	7/5/83
4,391,629	06/341,379	7/5/83
4,391,644	06/341,233	7/5/83
4,391,648	06/274,972	7/5/83
4,391,654	06/275,709	7/5/83
4,391,662	06/328,507	7/5/83
4,391,675	06/337,324	7/5/83
4,391,678	06/322,503	7/5/83
4,391,681	06/377,606	7/5/83
4,391,694	06/347,864	7/5/83
4,391,696	06/296,225	7/5/83
4,391,703	06/365,889	7/5/83
4,391,708	06/351,633	7/5/83
4,391,709	06/257,895	7/5/83
4,391,716	06/333,300	7/5/83
4,391,731	06/289,676	7/5/83
4,391,738	06/343,570	7/5/83
4,391,744	06/357,157	7/5/83
4,391,758	06/369,549	7/5/83
4,391,762	06/339,684	7/5/83
4,391,763	06/223,947	7/5/83
4,391,792	06/292,054	7/5/83
4,391,796	06/370,399	7/5/83
4,391,805	06/311,184	7/5/83
4,391,810	06/335,936	7/5/83
4,391,820	06/269,735	7/5/83
4,391,821	06/284,573	7/5/83
4,391,822	06/403,788	7/5/83
4,391,834	06/355,166	7/5/83
4,391,840	06/266,693	7/5/83
4,391,844	06/277,920	7/5/83
4,391,847	06/312,614	7/5/83
4,391,858	06/323,367	7/5/83
4,391,863	06/314,120	7/5/83
4,391,879	06/326,506	7/5/83
4,391,881	06/274,462	7/5/83
4,391,892	06/321,102	7/5/83
4,391,902	06/310,882	7/5/83
4,391,920	06/283,675	7/5/83
4,391,943	06/336,713	7/5/83
4,391,951	06/336,712	7/5/83
4,391,956	06/336,714	7/5/83
4,391,957	06/399,791	7/5/83
4,391,960	06/270,483	7/5/83
4,391,978	06/252,540	7/5/83
4,391,987	06/347,473	7/5/83
4,391,988	06/347,478	7/5/83
4,391,993	06/348,538	7/5/83
4,392,001	06/335,817	7/5/83
4,392,003	06/271,429	7/5/83
4,392,008	06/320,946	7/5/83
4,392,017	06/241,122	7/5/83
4,392,033	06/251,430	7/5/83
4,392,046	06/247,867	7/5/83
4,392,058	06/289,151	7/5/83
4,392,071	06/282,390	7/5/83
4,392,074	06/252,298	7/5/83
4,392,081	06/288,855	7/5/83
4,392,090	06/322,062	7/5/83
4,392,092	06/219,384	7/5/83
4,392,096	06/311,687	7/5/83
4,392,103	06/271,217	7/5/83
4,392,112	06/300,121	7/5/83
4,392,123	06/265,114	7/5/83
4,392,132	06/273,374	7/5/83
4,392,155	06/216,009	7/5/83
4,392,186	06/216,443	7/5/83
4,392,241	06/258,987	7/5/83
4,392,248	06/308,611	7/5/83

Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c);37 CFR 1.378)

The patent listed below is considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenace fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,353,243	06/230,817	10/12/82	2/2/81	8/26/87

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicatedExamining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,421,122, Re. S.N. 083,848, Filed Aug. 7, 1987, Cl. 128/731, BRAIN ELECTRICAL ACTIVITY MAPPING, Frank H. Duffy, Owner of Record: *Children's Hospital Medical Center, Boston, Mass.*, Attorney or Agent: David E. Brook, et al., Ex. Gp.: 335

4,495,897, Re. S.N. 007,454, Filed Jan. 27, 1987, Cl. 119/148, CATTLE STANCHION APPARATUS, Teo Albers, Sr., Owner of Record: *Inventor,* Attorney or Agent: None, Ex. Gp.: 333

4,500,513, Re. S.N. 015,827, Filed Feb. 18, 1987, Cl. 424/89, INFLUENZA VACCINE PRODUCTION IN LIQUID CELL CULTURE, Karen K. Brown, et al., Owner of Record: *Mobay Corp., Pittsburgh, Pa.*, Attorney or Agent: Gene Harsh, et al., Ex. Gp.: 123

4,510,411, Re. S.N. 083,443, Filed Aug. 10, 1987, Cl. 310/316, DRIVE CIRCUIT FOR SURFACE-WAVE DRIVEN MOTOR UTILIZING ULTRASONIC VIBRATION, Kazuo Hakamata, et al., Owner of Record: *Nippon Kogaku, Tokyo, Japan,* Attorney or Agent: Nelson H. Shapiro, et al., Ex. Gp.: 212

4,536,026, Re. S.N. 083,726, Filed Aug. 10, 1987, Cl. 297/39, FOLDING CHAIR, Howell N. Cornell, Owner of Record: *Keller Industries, Inc., Miami, Fla.,* Attorney or Agent: J. Rodman Steele, Jr., et al., Ex. Gp.: 357

4,568,234, Re. S.N. 080,437, Filed July 31, 1987, Cl. 414/404, WAFER TRANSFER APPARATUS, Steven N. Lee, et al., Owner of Record: *A.S.Q. Boats, Inc., Tustin, Calif.,* Attorney or Agent: Louis J. Knobbe, et al., Ex. Gp.: 317

4,670,178, Re. S.N. 082,860, Filed Aug. 4, 1987, Cl. 252/95, METHOD FOR THE SIMULTANEOUS CLEANING AND DISINFECTING OF CONTACT LENSES, Stanley W. Huth, et al., Owner of Record: *Allergan Pharmaceuticals, Inc., Irvine, Calif.,* Attorney or Agent: Douglas B. Henderson, et al., Ex. Gp.: 115

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

No Publications This Issue.

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Aubrey McDonald Creations, Inc., Akron, Ohio, Reg. No. 1,241,099, for the mark "AUBREY CREATIONS AND DESIGN", Canc. No. 16,169.

Willoughby's Restaurant, Inc., Deerfield Beach, Fla., Reg. No. 945,393, for the mark "WILLOUGHBY'S AND DESIGN", Canc.No. 16,359.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Service by Publication

A petition to cancel the registration identifed below having been filed, and the notice of such proceedings sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Pixel Computer, Inc., assignee of Instrumentation Laboratory Inc., Andover, Mass., Reg. No. 1,249,713, for the mark "PIXEL 100/AP", Canc. No. 15,975.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

PATENT NOTICES

Certificates of Correction for the Week of Sept. 22, 1987

4,338,179	4,633,622	4,650,773	4,665,251
4,476,057	4,633,732	4,651,009	4,665,362
4,540,048	4,633,812	4,652,853	4,666,055
4,541,974	4,634,036	4,653,502	4,666,205
4,553,901	4,634,875	4,654,717	4,666,548
4,567,286	4,636,038	4,654,952	4,666,687
4,573,303	4,637,481	4,655,130	4,666,842
4,576,644	4,637,623	4,655,824	4,666,913
4,588,656	4,638,009	4,656,328	4,667,150
4,591,897	4,638,058	4,656,623	4,667,191
4,600,574	4,638,611	4,656,625	4,667,329
4,601,083	4,639,622	4,656,943	4,667,365
4,609,224	4,640,893	4,657,237	4,667,874
4,609,539	4,641,257	4,657,406	4,668,771
4,610,385	4,641,557	4,657,510	4,668,772
4,613,386	4,642,193	4,657,631	4,668,854
4,613,661	4,642,438	4,657,966	4,668,947
4,615,277	4,642,477	4,658,300	4,669,388
4,615,672	4,642,544	4,658,405	4,669,394
4,618,456	4,643,253	4,659,101	4,669,466
4,621,159	4,643,904	4,659,136	4,669,840
4,623,448	4,645,684	4,659,190	4,669,885
4,623,905	4,646,233	4,659,284	4,670,006
4,624,558	4,646,942	4,659,396	4,670,225
4,625,811	4,647,292	4,659,663	4,670,573
4,626,412	4,648,011	4,661,331	4,670,691
4,626,970	4,648,154	4,661,355	4,671,333
4,628,021	4,648,178	4,661,650	4,672,129
4,628,233	4,649,090	4,661,882	4,672,169
4,628,743	4,649,122	4,662,371	4,672,203
4,629,484	4,649,791	4,662,750	4,672,301
4,629,636	4,650,000	4,663,425	4,673,136
4,630,034	4,650,551	4,664,235	4,676,796
4,631,051	4,650,604	4,664,596	4,677,631
4,631,425	4,650,626	4,664,992	4,678,984
4,631,489	4,650,671	4,665,043	
4,632,363	4,650,711	4,665,248	

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF August 15, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-13-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	9-07-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-16-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	7-10-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-25-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	5-28-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during August 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,522,401 to 3,526,003, inclusive

Plant Patents ..... Numbers 2,986 to 2,988 inclusive

REEXAMINATIONS

SEPTEMBER 22, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,439,311 (760th)

REREFINING USED LUBRICATING OIL WITH HYDRIDE REDUCING AGENTS

Richard H. O'Blasny, Natchitoches, La., assignor to Delta Central Refining, Inc., Natchitoches, La.

Reexamination Request No. 90/001,110, Oct. 6, 1986.

Reexamination Certificate for Patent No. 4,439,311, issued Mar. 27, 1984, Ser. No. 336,900, Jan. 4, 1982.

Int. Cl.[4] C10G *7/10, 7/00;* **C10M** *11/00*

U.S. Cl. 208—179

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–17 are cancelled.

[1. A method of rerefining used lubricating oil comprising contacting the used lubricating oil with at least one hydride reducing agent selected from the group consisting of sodium borohydride, potassium borohydride, zinc borohydride, sodium cyanoborohydride, sodium sulfurated borohydride, sodium trioxyacetal borohydride, sodium trialkoxy borohydride, sodium hydroxyl borohydride, sodium borohydride, anilide, tetrahydrofuran borohydride, di-methyl-butyl borohydride, lithium-aluminum hydride, lithium-aluminum tri-oxymethyl hydride, sodium-aluminum-2-methoxyethoxy hydride, and aluminum hydride.]

B1 4,504,383 (761st)

REREFINING USED OIL WITH BOROHYDRIDE REDUCING AGENTS

Richard H. O'Blasny, Natchitoches, La., assignor to Delta Central Refining, Inc., Natchitoches, La.

Reexamination Request No. 90/001,111, Oct. 6, 1986.

Reexamination Certificate for Patent No. 4,504,383, issued Mar. 12, 1985, Ser. No. 578,357, Feb. 8, 1984.

Continuation-in-part of Ser. No. 336,900, Jan. 4, 1982, Pat. No. 4,439,311.

The portion of the term of this patent subsequent to Mar. 27, 2001, has been disclaimed.

Int. Cl.[4] C10G *7/10, 7/00;* **C10M** *11/00*

U.S. Cl. 208—179

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–13 are cancelled.

[1. A method of rerefining used oil comprising contacting the used oil with at least one borohydride reducing agent.]

B1 4,558,179 (762nd)

MESSAGE PLAYBACK CONTROL SYSTEM FOR TELEPHONE ANSWERING MACHINE

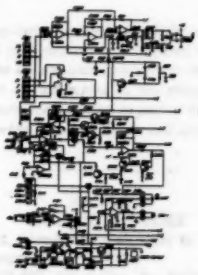
Raymond G. Bond, Long Beach, Calif., assignor to Fortel Inc., Compton, Calif.

Reexamination Request No. 90/001,105, Sep. 30, 1986.

Reexamination Certificate for Patent No. 4,558,179, issued Dec. 10, 1985, Ser. No. 527,978, Aug. 31, 1983.

Int. Cl.[4] H04M *1/65;* **G11B** *15/00*

U.S. Cl. 379—70



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–5 are now disclaimed.

[1. In a telephone answering system which responds to telephone messages received over a telephone line and which includes a magnetic tape mechanism for recording messages received over the telephone line on a magnetic tape, the combination of: a microcomputer; manually operated local switch means connected to the microcomputer; circuit means connecting the microcomputer to the magnetic tape mechanism to cause the magnetic tape mechanism to rewind the magnetic tape in a reverse direction to a predetermined origin position when the switch means is manually operated; further circuit means connecting the microcomputer to the magnetic tape mechanism to cause the magnetic tape mechanism to move the magnetic tape in the forward direction after it has reached said predetermined origin position; control circuitry connected to the microcomputer for enabling the microcomputer to stop the forward motion of the magnetic tape mechanism after it has returned to the position at which the switch means was manually operated; a sound transducer; and circuit means connecting the magnetic tape mechanism to the sound transducer to cause the sound transducer to reproduce the message recorded on the magnetic tape during the forward motion thereof.]

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

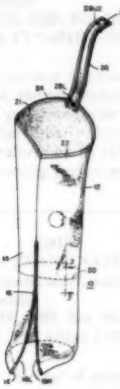
Re. 32,506
SNAKE PROOF CHAPS

George H. Hightower, Jr., Thomaston, Ga., assignor to Thomaston Mills, Inc., Thomaston, Ga.

Original No. 4,382,301, dated May 10, 1983, Ser. No. 273,067, Jun. 12, 1981. Application for reissue Jan. 30, 1984, Ser. No. 575,296

Int. Cl.[4] A41D *13/06;* F41H *1/02*

U.S. Cl. 2—22 27 Claims



11. A protective article of clothing adapted to prevent snake fangs from biting into the leg of a wearer, said protective article comprising:

(a) a generally tubular leg enclosing portion made of a woven fabric of nylon resistant to snake bites and having an upper part and a lower part, said lower part including a fastener for connecting two side edges of the lower part, and

(b) a securing means attached to said upper part for holding the leg enclosing portion up on a wearer's leg, and

wherein said leg enclosing portion comprises nylon fiber in the form of continuous filament yarn, said woven fabric is made of threads between 900 and 1100 denier and wherein said leg enclosing portion prevents penetration by snake fangs even when the snake fangs are longer than the thickness of the leg enclosing portion, and said leg enclosing portion is less than ¼" in thickness.

Re. 32,507
OPENING ROLLER UNIT FOR OPEN-END SPINNING INSTALLATIONS

Friedbert Schmid, Ueberkingen, and Hans Raasch, Monchen-Gladbach, both of Fed. Rep. of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Original No. 4,435,953, dated Mar. 13, 1984, Ser. No. 388,219, Jun. 14, 1982. Application for reissue Mar. 10, 1986, Ser. No. 837,727

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1981, 3123480

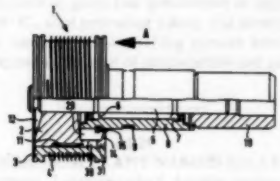
Int. Cl.[4] D01H *7/895, 7/892;* D01G *15/28*

U.S. Cl. 57—408 33 Claims

19. Opening roller ring assembly for an opening roller unit for open-end spinning installations of the type having a shaft supported in a bearing box, and an opening roller base member unit arranged on an end of the shaft which projects from the bearing box for rotation with said shaft with the opening roller base member unit extending over the bearing box in a manner forming a cavity with an annular sealing gap, said opening roller ring assembly comprising:

a ring member, and

fitting means projecting outwardly from the outer circumference of the ring member, said ring member being detachably connectable to the opening roller base member unit for accommodating interchangeability of the roller ring assembly, wherein said ring member is configured to block access from the outside to an annular sealing gap in said base member unit when in an assembled in use position on the opening roller base member unit and to permit access to the annular sealing gap when displaced from said assembled in use position.



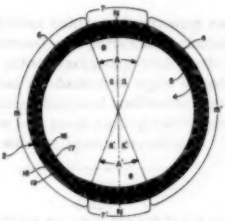
Re. 32,508
HOSE STRUCTURE

Robert H. Feucht, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Original No. 3,856,052, dated Dec. 24, 1974, Ser. No. 276,629, Jul. 31, 1972. Continuation of Ser. No. 016,680, Apr. 25, 1979, abandoned. Application for reissue Jun. 29, 1981, Ser. No. 278,019

Int. Cl.[4] F16L *11/12*

U.S. Cl. 138—119 17 Claims



18. A material transporting hose of integral construction comprising a body of flexible resilient elastomeric material having a generally circular cross-sectional configuration, said body including:

an inner tube and an outer cover; reinforcing material of a balanced symmetrical construction extending generally circumferentially about said tube and surrounded by said cover to provide reinforcement against radial forces within the hose; and

a pair of circumferentially spaced longitudinally reinforced portions having in cross section a total combined perimeter which is substantially less than the perimeter of the cross section of the body, said portions extending substantially the entire length of the hose thereby providing primary resistance to elongation of the hose and constriction of the hose opening

caused by excessive end loads, said portions being surrounded by said cover so as to be disposed completely within said body on opposite sides of the cross section thereof between said cover and said tube, said cover having a substantially uniform thickness with no substantial protuberances therein, said portions each including a plurality of elongated stress-resisting reinforcing members with substantially an equal number of said members in each portion to provide a balanced symmetrical hose construction, each said member extending generally parallel to the longitudinal axis of the hose for substantially the entire length of said hose, and being capable of withstanding substantial longitudinal stresses applied to the end of the hose to provide the hose with longitudinal strength; and

remaining portions free of said reinforcing members disposed adjacent to said longitudinally reinforced portions on each side thereof with said longitudinally reinforced portions having a total combined perimeter equal to or less than the total combined perimeter of the remaining portions of the cross-section of said body therebetween to provide a hose construction in which at least one-half of the hose remains flexible in a longitudinal direction for enabling the hose to be more easily reeled upon itself and less likely to develop kinks.

PLANT PATENTS

GRANTED SEPTEMBER 22, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,017

GERANIUM PLANT NAMED GYPSY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 810,675

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Gypsy, as described and illustrated, and particularly characterized by its light pink flower color, variegated with deep purple; compact self-branching growth habit; early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; and ease of propagation and good rooting habit.

6,018

GERANIUM PLANT NAMED ROSY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 810,742

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Rosy, as described and illustrated, and particularly characterized by its pale pink flower color, variegated with dark red-purple; floriferous, compact self-branching growth habit; early flowering response; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; good resistance against parasites; and ease of propagation and good rooting habit.

6,019

GERANIUM PLANT NAMED JOSY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,116

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Josy, as described and illustrated, and particularly characterized by its rose-pink flower color with very dark red variegation on upper petals; dark green foliage; very early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; compact, self-branching growth habit; and by its ease of propagation and good rooting habit.

6,020

GERANIUM PLANT NAMED PEGGY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,117

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Peggy, as described and illustrated, and particularly characterized by its light red-purple flower color, variegated with dark red-purple; very early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; compact, self-branching growth habit; very floriferous habit; and by its ease of propagation and good rooting habit.

6,021

GERANIUM PLANT NAMED SALLY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 811,154

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Sally, as described and illustrated, and particularly characterized by its bright red-purple flower color with small, dark red-purple variegation on upper two petals; compact, floriferous, self-branching growth habit; early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; medium green foliage; and by its ease of propagation and good rooting habit.

6,022

GERANIUM PLANT NAMED LILLY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mirko Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 810,704

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Lilly, as described and illustrated, and particularly characterized by its violet-red flower color, variegated with dark purple; early flowering; good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period; ease of propagation and good rooting habit; compact growth habit; and good resistance against parasites.

6,023

GERANIUM PLANT NAMED CANDY

Wolfgang Kirmann, Langenzersdorf, Austria, assignor to Mikro Vavra, Bisamberg, Austria

Filed Dec. 19, 1985, Ser. No. 810,705

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium named Candy, as described and illustrated, and particularly characterized by its floriferous habit, very compact and self-branching growth habit, light red-purple flower color with a much deeper red-purple variegation in the upper two petals, medium early flowering, good bud production at night temperatures up to 16° C., thus providing a long and continuous flowering period, and by its ease of propagation and good rooting habit.

PLANT PATENTS

CRAVEN SWEETHEART

P.P. 1,075

Craven Sweetheart, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,075

1 Claim. (Cl. 1-1)

1. A new and distinct variety of sweetheart rose substantially as described and illustrated.

CRAVEN CRIMSON

P.P. 1,076

Craven Crimson, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,076

1 Claim. (Cl. 1-1)

1. A new and distinct variety of crimson rose substantially as described and illustrated.

CRAVEN PINK

P.P. 1,077

Craven Pink, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,077

1 Claim. (Cl. 1-1)

1. A new and distinct variety of pink rose substantially as described and illustrated.

CRAVEN GOLDEN

P.P. 1,078

Craven Golden, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,078

1 Claim. (Cl. 1-1)

1. A new and distinct variety of golden rose substantially as described and illustrated.

CRAVEN SNOWBALL

P.P. 1,079

Craven Snowball, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,079

1 Claim. (Cl. 1-1)

1. A new and distinct variety of snowball rose substantially as described and illustrated.

CRAVEN PURPLE

P.P. 1,080

Craven Purple, Greenwood, Alaska, assignor to Craven Nurseries, Alaska

Filed Dec. 10, 1957, Ser. No. 1,080

1 Claim. (Cl. 1-1)

1. A new and distinct variety of purple rose substantially as described and illustrated.

PATENTS

GRANTED SEP. 22, 1987

ERRATA

For CLASS	See PATENT NO.
437-052	4,694,561
437-057	4,694,562
437-040	4,694,563
437-040	4,694,564
437-034	4,694,565
437-048	4,694,566
453-059	4,694,845
166-377	4,694,878
164-432	4,694,899
237-008	4,695,052
439-095	4,695,105
439-083	4,695,106
439-083	4,695,107
439-059	4,695,108
439-155	4,695,109
439-289	4,695,110
439-266	4,695,111
439-350	4,695,112
439-404	4,695,113
439-573	4,695,114
439-076	4,695,115
439-188	4,695,116
439-188	4,695,117
439-726	4,695,118
437-031	4,695,328
437-126	4,695,331
437-126	4,695,332
209-211	4,695,371
361-018	4,695,413
436-064	4,695,471
437-225	4,695,480
568-310	4,695,673
346-140	4,695,824
380-005	4,695,901
364-506	4,695,982
364-709	4,695,983
375-046	4,696,023

PATENTS

GRANTED SEP. 22, 1987

INDEX

PATENTS

GRANTED SEPTEMBER 22, 1987

GENERAL AND MECHANICAL

4,694,505

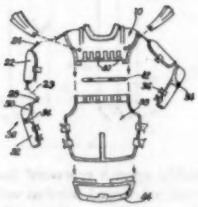
UPPER BODY PROTECTOR FOR OFF-ROAD RIDERS

Corrado Flosi, Via Rosselli 8, S. Romano (Ri); Alberto Gobbi, Vie Anadeo 24, Milano; Roberto Maccioni, Via Vittor Pisani 37, Vi Reggio, and Guerrieri Simonetta, Via Rosselli 8, S. Romano, all of Italy

Filed Mar. 30, 1984, Ser. No. 595,404

Int. Cl.[4] A41D *13/00*

U.S. Cl. 2—2 **6 Claims**



1. An upper body protector comprising:

(a) a unitary, at least semi-rigid shoulder cover extending completely over the shoulder from the dorsal side of the body to the ventral side thereof and defining a neck opening;

(b) a ventral shield extending down from the front of said cover to shield the chest;

(c) means for holding the ventral shield against the body;

(d) a pair of epaulets arching dorsally-to-ventrally over the shoulder articulations and being mounted to said shoulder cover;

(e) said epaulets being pivotally mounted at their dorsal and ventral extremes to said cover to pivot toward and away from the neck opening of said shoulder; and,

(f) including a raised rib on each side of said neck opening on said shoulder cover positioned and dimensioned to act as a stop to prevent inward motion of said epaulets toward the neck beyond a predetermined point.

4,694,506

FOLDABLE EYESHADE

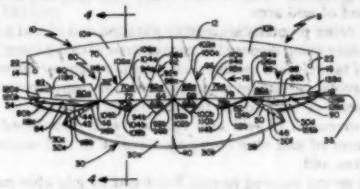
Fred P. Perna, 1417 West Park, Anaconda, Mont. 59711

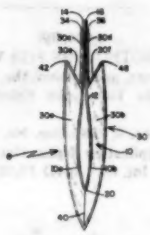
Filed Feb. 26, 1987, Ser. No. 19,249

Int. Cl.[4] A61F *9/04*

U.S. Cl. 2—12 **15 Claims**

1. An eyeshade comprising a headband of sheet material having a first edge and having a central fold line intersecting its said first edge, a visor of sheet material having a second edge complementing the first edge on said headband and having a central fold line intersecting its said second edge, said visor also having a first pair of acutely angled fold lines having their apex spaced to one side of the central fold line on said visor and a second pair of acutely angled fold lines having their apex spaced to the other side of the central fold line on said visor, both of said apices being adjacent the second edge of said visor, and tape means overlying segments of said first and second edges with first portions thereof being secured to portions of said headband and with second portions thereof being secured to portions of said visor to maintain said central fold lines in





alignment with each other and to also maintain said apices in a proximal relationship with the first edge of said headband.

4,694,507

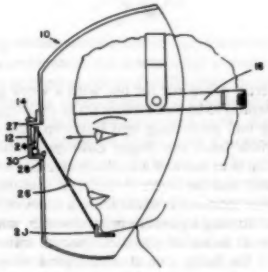
WELDER'S HOOD HAVING A CHIN OPERATED WINDOW CLOSURE

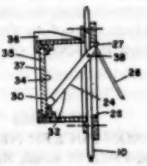
Steven M. Owen, R.R. 1, Box 136, Henry, S. Dak. 57243

Filed Sep. 10, 1986, Ser. No. 905,548

Int. Cl.[4] A61F *9/06*

U.S. Cl. 2—8 **6 Claims**





1. In a hood having an opening therein and a closure member having inner and outer surfaces, said closure member being pivotally secured to said hood over said opening, a chin oper-

ated mechanism for opening and closing said opening comprising;

a. a chin engaging member pivotally mounted in said hood for pivotal movement between first and second positions;

b. an arm pivotally secured to said hood adjacent said opening;

c. a rod having one end pivotally secured to said chin engaging member and a second end pivotally secured to a first end of said arm;

d. a roller pivotally secured to a second end of said arm, said roller being disposed in engagement with the inner surface of said closure member, said closure member disposed for pivotal movement to an open position responsive to movement of said roller thereacross in response to pivotal movement of said arm responsive to downward movement of said chin engaging member to said second position; and,

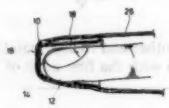
e. a spring secured to said hood and to said chin engaging member for biasing said chin engaging member toward said first position.

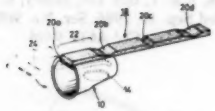
4,694,508

FINGERTIP PROTECTORS FOR WORK GLOVES

Shozo Iriyama, Kuwana, and Mitsuo Abe, Chita, both of Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Aichi, Japan

Filed Sep. 9, 1986, Ser. No. 905,745
Claims priority, application Japan, Oct. 16, 1985, 60-230442
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—21 **1 Claim**





1. A fingertip protector for use with a work glove comprising a cap adapted to be detachably fitted on a fingertip of a user for covering and protecting said fingertip, said cap having an opening which faces the finger cushion of the user's finger when said cap is in use and a cushion member to be secured to both the inner and the outer surfaces of said cap, wherein:

said cushion member is made from a sheet of foamed plastic material having a predeterimined width, said sheet having thereon a series of parallel spaced transverse tapered notches for being cut at and folded about the tapered notches to form said cushion member, such that said cushion member extends from the outer surface of said cap to the inner surface thereof so that a tapered end of said cushion member is disposed on the inner surface of said cap.

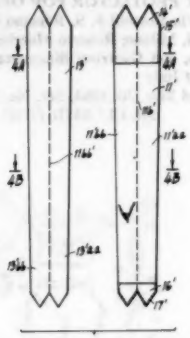
4,694,509

NON-PUCKER NECKTIE

Moe M. Grubman, 99-32/66 Road, Rego Park, N.Y. 11374

Filed Sep. 19, 1985, Ser. No. 777,767
Int. Cl.[4] A41D *25/06*
U.S. Cl. 2—144 **10 Claims**

1. A necktie comprising in combination, a necktie outer ornamental material of predetermined width and length dimensions prior to a folding and rearward overlapping of opposite edges thereof, a woolen-type continuous lining material of shape with width and length dimensions substantially identical to said necktie outer ornamental material of predetermined width and length dimensions, and said lining material beng



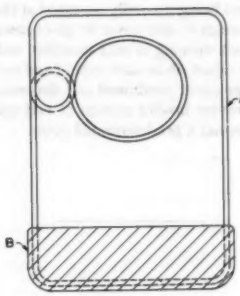
superimposed flushly upon a rearward face of necktie outer ornamental material positioned thereon such that corresponding width and length shapes substantially correspond, and opposite edges of the outer ornamental material and the lining material being at side edges thereof folded rearwardly and overlapped and slip-stitched together with stitches.

4,694,510

BIB WITH TEETHING SURFACE

Theresa K. Kamrath, Rt. 5, Box 35, Rice Lake, Wis. 54868

Filed Jan. 30, 1986, Ser. No. 734,862
Int. Cl.[4] A61J *17/00*; A41D *13/10*
U.S. Cl. 2—49 R **1 Claim**



1. A teething bib for babies comprising a thickness of non-toxic rubber attached at the bottom of the bib on both front and back sides.

4,694,511

COMBINATION GARMENT AND PROTECTIVE SEAT COVER

Donna L. Estes, 8430 Franklyn Ave., Los Angeles, Calif. 90069, and Carol A. Hilson, 464 Thirty Fourth St., Manhattan Beach, Calif. 90266

Filed Jun. 13, 1986, Ser. No. 873,967
Int. Cl.[4] A41D *23/00*; A47C *27/00*
U.S. Cl. 2—69 **27 Claims**

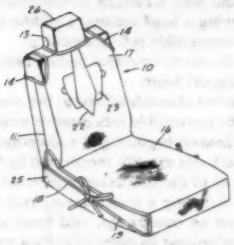
1. An article of manufacture for selective use either as a temporary protective cover for a head-rest equipped vehicle seat or as a garment for use by swimsuit clad persons while in transit to and from the beach, the article comprising:

a unitary piece of a flexible sheet-like fabric material having (a) an elongated tubular upper portion of substantially uniform diameter, and (b) an attached essentially rectangularly shaped lower panel depending from approximately one-half the girth of one end of the tubular upper portion,

the other end of the tubular upper portion being closed except for a central opening and a pair of corner openings, the central opening being large enough for assembly over the head-rest of the vehicle seat,

the pair of corner openings being adapted to fit about the upper corners of the seat back of the vehicle seat,

the tubular upper portion being sized to substantially embrace and enclose the seat back of the vehicle seat,



the lower panel being sufficiently long and wide to substantially cover the entire seating surface of said vehicle seat when outstretched over the seating surface, and

fastener means on the lower panel for securing said article to the vehicle seat to protect the seat from staining and to prevent direct contact between the seat and persons seated thereon in swimsuit wearing apparel enroute to and from the beach, the article also being adapted for being selectively worn as a garment when removed from the vehicle seat, the large central opening and the corner openings providing head and arm-receiving openings when the tubular upper portion is worn on the person's upper torso, and in which the lower panel is large enough to be wrapped around the front and rear sides of the lower torso and secured thereto by the fastener means.

4,694,512

PLUMBING MIXING CIRCUIT CONTROL APPARATUS FOR A COMBINATION SET

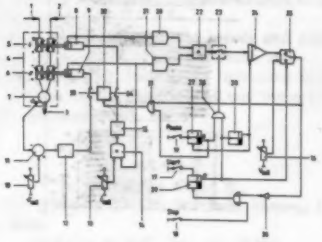
Werner Knebel, Iserlohn, and Günter Sieberhagen, Hagen, both of Fed. Rep. of Germany, assignors to Knebel & Rottger GmbH & Co., Fed. Rep. of Germany

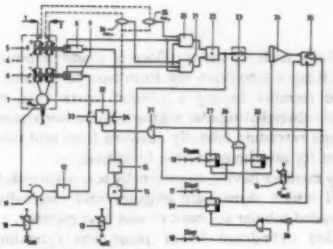
Filed Jun. 5, 1986, Ser. No. 870,818

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1985, 3531294

Int. Cl.[4] E03C *1/04*

U.S. Cl. 4—192 19 Claims





1. Plumbing mixing circuit control apparatus for controlling a plumbing combination set comprising a multi-disc mixing valve for two streams of hot and cold water or other fluids, to make a temperature adjustment by a comparison between a measurement figure for the mixture such as the actual temperature of the mixing water or fluids, and a preselected target figure which is the target temperature of the mixing water, wherein the actual value for the mixture is continuously measured and a factor for the regulator of the appropriate mixing valve adjustment disc is derived from the target/actual divergence, and at the same time the preselected flow quantity of the mixture can be maintained at a constant level without measurement of the flow quantities, such correction figure being derived from the said adjustment disc for flow control of the disc regulator, said plumbing mixing circuit control apparatus further comprising at least one mixture adjustment disc and at least one temperature adjustment disc; each at least one said disc having a regulator engaged therewith, substractor means for an adjustment algorithm;

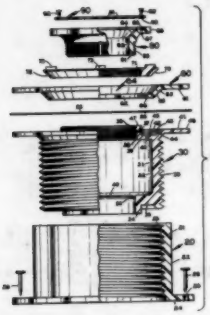
adjustment circuit means for maintaining liquid flow at a steady level, said circuit constituting a factor that the regulator which engages the flow adjustment disc, said factor being derived from the target flow by a signal transformer in communication therewith and a function generator communicating with said regulator for computing a regulated corrective factor.

4,694,513

DRAIN

Floyd G. Kiziah, 501 N. 44th Ave., Hollywood, Fla. 33021

Filed Jan. 22, 1987, Ser. No. 6,019
Int. Cl.[4] E03C 1/26
U.S. Cl. 4—288 9 Claims



1. A floor drain for use in a floor of solidified poured material overlying a temporary sub form base comprising:

a base member having a tubular, upstanding, internally screw-threaded tubular segment and a horizontal bottom flange extending laterally outward from said tubular segment for attachment to the form base;

a body member having an externally screw-threaded annular wall which threadedly engages said internally screw-threaded tubular segment of said base member, a smooth-walled cylindrical lower projection extending down below said annular wall at the lower end of said body member, said lower projection having a smaller inside and outside diameter than the inside diameter of said annular wall, an annular upper projection extending up above said annular wall, said upper projection having internal and external screw threads and having a smaller inside and outside diameter than said annular wall, and an annular top flange extending horizontally outward past the upper end of said annular wall;

a deformable annular membrane overlying said top flange and the upper end of said body member laterally outward from said upper projection;

an annular membrane retainer overlying said membrane across and beyond its entire extent;

a ring overlying said membrane retainer for part of its lateral extent, said ring having internal screw threads which threadedly engage said external screw threads on said upper projection of said body member and holding said membrane retainer down to clamp said membrane against the top of said body member;

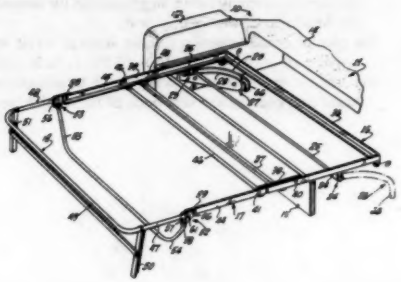
and an annular strainer holder having an externally screw-threaded lower end segment threadedly engaging said internal screw threads on said upper projection of said body member, said strainer holder having an annular flange on its upper end extending laterally outward beyond its screw-threaded lower end segment and across the top of said ring, said flange on the strainer holder presenting an upwardly-facing annular seat for receiving a perforated strainer.

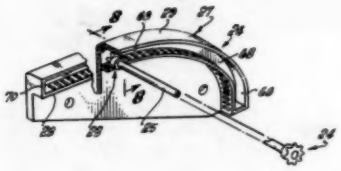
4,694,514

CONVERTIBLE SOFA MECHANISM

Edward H. Crossett, 23333 Ridge Rte., #175, El Toro, Calif. 92630

Continuation-in-part of Ser. No. 773,982, Sep. 9, 1985, Pat. No. 4,612,677. This application Aug. 13, 1986, Ser. No. 896,012
Int. Cl.[4] A47C 17/14
U.S. Cl. 5—12 R 13 Claims





1. A three-section convertible sofa mechanism installed in a convertible sofa and which may be forwardly extended to a full length bed having a head section, a middle section and a foot section, said convertible sofa comprising:

a convertible sofa exterior member having two arms, a back and a front support beam;

right and left curved channels affixed to the inner surfaces of the arms of the convertible sofa exterior member, each of said curved channels beginning at a lowermost point near the back of said sofa exterior member to its highest point nearer the front of the sofa exterior member;

a head section including a frame having two sides and an inner edge and an outer edge, said head section frame being supportable near its outer edge by a pair of bearing means affixed to the two sides of the frame and said bearing means being supported by said right and left curved channels and being movable therealong from its inner position where the head section is in its lowermost position to its outer position when the head section is in its uppermost position and said uppermost point of said curved channel in about a horizontal position;

synchronizing means comprising a rotatable shaft including gear means at each end thereof, said gear means intermeshing with rack means held by said right and left curved channels;

a middle section hingedly affixed to said frame of said head section near its outer edge so that said middle section may be pivoted back over said head section;

a foot section hingedly affixed to said middle section near the outer edge thereof so that the foot section is movable so that the bottom of the foot section is movable to be adjacent to the bottom of the middle section; and

a pair of legs near the intersection of the middle section and the foot section.

4,694,515

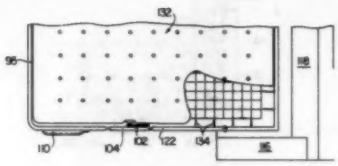
SELF-INFLATABLE AIR MATTRESS IN A FOLDABLE SUPPORT

Walter C. Rogers, Jr., Denton, N.C., assignor to Parma Corporation, Denton, N.C.

Continuation-in-part of Ser. No. 678,965, Dec. 6, 1984, abandoned. This application Jun. 26, 1986, Ser. No. 878,587

Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—13 **12 Claims**



1. An air mattress comprising in combination a foldable body including opposite upper and lower walls and side walls defining an air chamber, resilient means in said chamber urging said upper and lower walls apart from each other while being yieldable to permit said upper and lower walls to be moved relative to each other to deflate the body, valve means on the body to admit air into and to expel air from said chamber, and actuating means connected to said valve means for closing and opening said valve means in response to unfolding and folding of the body, and wherein said valve means is located in at least one of the walls of the mattress and said actuating means includes means connected to a foldable frame for actuating the valve in response to folding movement of the frame.

4,694,516

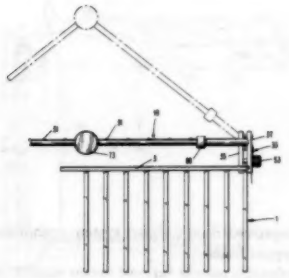
PLAYPEN SUN COVER

Patrick Overman, Sr., 9704 Southeast 7th St., and Elldon Baird, 10010 N.E. 6 Circle, both of Vancouver, Wash. 98664

Filed Jan. 24, 1986, Ser. No. 822,154

Int. Cl.[4] A47C *29/00*

U.S. Cl. 5—93 R **11 Claims**



1. An improved sun cover comprising:

(a) a frame removably attachable to an enclosure;

(b) covering means removably and adjustably attached over said frame;

(c) said frame including side rods pivotably connected to one another to enable said cover to be adjusted to different configurations;

(d) said side rods pivoting about a main rod centrally located in said frame and disposed substantially perpendicular to said side rods, said side rods including first and second substantially parallel side rods to one side of said main rod and third and fourth substantially parallel rods to another side of said main rod, said first and third rods being pivotable with respect to one another and said second and fourth rods being pivotable with respect to one another;

(e) a first end rod substantially parallel to said main rod and mounted on ends of said first and third side rods remote from said main rod, and a second end rod substantially parallel to said main rod and mounted on ends of said second and fourth side rods remote from said main rod;

(f) said frame being removably attachable to said enclosure by fastening means connected to said end rods, said fastening means comprising at least one fastener on each end rod and comprising:

(1) two facing clamping halves including interengaging structure enabling the halves to be moved toward and away from one another;

(2) a first recess between said halves and adapted to surround one of said end rods;

(3) a second recess between said halves and adapted to surround a top portion of said enclosure; and

(4) adjusting means for controllably tightening said halves about said one of said end rods and said top portion substantially simultaneously.

4,694,517

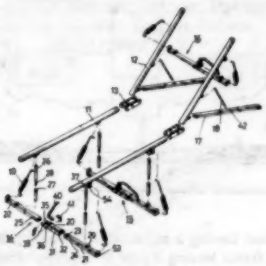
UNIVERSAL COUCH

Yui-Chen Lin, 237, Syh Te Rd., Wu Fong Hsiang, Taichung Hsien, Taiwan

Filed Feb. 4, 1987, Ser. No. 10,668

Int. Cl.[4] A47C *19/16*

U.S. Cl. 5—114 **3 Claims**



1. An improved universal couch, especially one characterized by comprising:

three sets of base frames, of which each set consists of two base elements, cover plates, supporting rods and elastic elements which are movably attached at two ends of the base elements; and the said three sets of base frames can be installed respectively at the front, middle and rear three special positions of the couch surface, in order to assemble and support the couch surface;

two couch frames, of which, each frame is arranged at one of the two sides of the couch surface, and of which each frame consists of two round tubes of the same size, said two tubes being connected together along the same direction, one in front of the another, by a connecting frame and said two tubes being able to be folded up for storing, furthermore, at two ends of the front tube and at underside of one end of the rear tube, a bushing and a fixed ear having been provided so that they can be used to connect supporting rods and elastic elements of the three sets of the base frame, in addition, two pivot-jointed pieces, leaving a proper distance between them, having been provided at the front end of the rear tube;

one couch surface made up from a whole sheet of tough material, each side of which having been provided with a long, looped sheath so that the two couch frames can be inserted into the said two sheaths respectively, further-

more, at the mouth of the sheath, indentation having been provided, in order to expose the mouth of couch frame and the fixed ear, in addition, at two sides of the rear couch surface a sling being sewed on:

one positioning rod and supporting rod, being movably attached to the pivot-jointed pieces of the rear tubes, and on the positioning rod, several positioning holes having been provided, so that by selecting the positioning holes for the supporting rod, the best angle of elevation of the rear couch surface can be obtained;

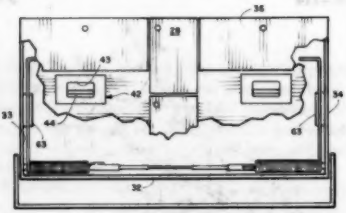
an improved universal couch being able to be assembled by means of the above elements such that the couch frame can be inserted into the looped sheaths at two sides of the couch surface, which is to be connected with three sets of the base frame in order to be constructed into a whole couch body, and the rear couch surface of which can be elevated the required angle by means of its positioning rod and supporting rod.

4,694,518

CABINET HAVING A RETRACTABLE BED

James L. Lukich, 9252-2 Mast Blvd., Santee, Calif. 92071, and John Zarkovacki, 558 E. El Norte Pkwy., Escondido, Calif. 92025

Filed Jun. 26, 1986, Ser. No. 878,812
Int. Cl.[4] A47C *19/06*
U.S. Cl. 5—136 **7 Claims**



1. A cabinet having a retractable bed comprising:

a cabinet frame having a pair of laterally spaced upstanding side walls being of a predetermined height and having a top end and a bottom end, a bottom wall having opposites ends that are connected to said side walls adjacent their bottom ends, a top wall having opposite ends that are connected to said side walls at a predetermined height, said walls forming a chamber for receiving a bed frame, the walls of said cabinet frame each having a front edge;

a bed frame having laterally spaced side walls, a front wall and a rear wall; and

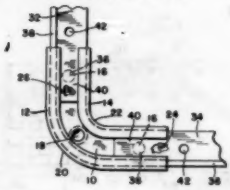
torsion spring means for pivotally mounting said bed frame in said cabinet frame so that said bed frame can be pivoted from a vertical stored position to a horizontal position, said torsion spring means comprises a square rod member having opposite ends that are rigidly supported in square apertures formed in two plates that are attached to opposing inside surfaces of the side walls of said cabinet frame, a square tubular sleeve telescoped over said tubular rod and secured thereto by a set screw, a snug fitting round tubular sleeve telescopically slid over said square tubular sleeve and frictionally held so that the two members cannot rotate with respect to each other, said round tubular member passing through aligned apertures in the side walls of said bed frame so that said bed frame can be pivoted thereabout, at least one coiled torsion spring mounted on said round tubular member, said torsion spring having a laterally extending leg member that is detachably captured by a stop on said bed frame, said coiled torsion spring having a second leg that is structurally secured to said round tubular member to prevent it from pivoting with respect to said round tubular member.

4,694,519

CORNER BRACKET

Roland A. Benoit, Danielson, Conn., assignor to Gem Industries, Inc., Gardner, Mass.

Filed Sep. 8, 1986, Ser. No. 904,708
Int. Cl.[4] A47C *19/00*
U.S. Cl. 5—200 C **11 Claims**



11. A corner bracket for joining two angle irons at angles to each other to form a corner, the bracket comprising a metallic channel in arc form, the channel including a plane bottom and a flange at each side of the bottom, the flanges extending in the same direction and being generally spaced and parallel,

a dimple and dimpler receiving means on and between each angle iron and the bracket, said dimple and its receiving means locating the angle irons relative to the bracket,

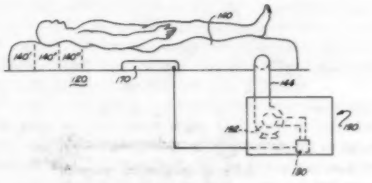
the angle irons having flanges of less width than the heights of the bracket flanges, the latter being crimped over onto the angle iron flanges and together with the dimples securing the angle irons and bracket together.

4,694,520

PATIENT SUPPORT APPARATUS

Patrick R. D. Paul, Johns Island, and James H. Price, Mt. Pleasant, both of S.C., assignors to SSI Medical Services, Inc., Charleston, S.C.

Filed Jan. 15, 1986, Ser. No. 819,119
Int. Cl.[4] A47C *27/10*; G08B *21/00*
U.S. Cl. 5—453 **8 Claims**



1. An improved fluid support system comprising:

(a) a support frame;

(b) an inflatable patient support means support by said frame;

(c) means for supplying fluid to said inflatable support means for support of a patient in a supine position thereon;

(d) detector means associated with said support means for determining inadequate inflation of said support means when a patient is residing thereon;

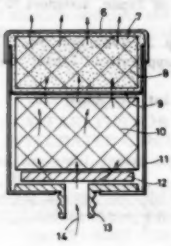
(e) timer means operatively associated with said detector means whereby said timer means is actuated simultaneously with said detector means and is deactuated upon cessation of operation of said fluid supply means; and

(f) control means operatively associated with said fluid supply means and said detector means for receiving input from said detector means that said support means is inadequately inflated and admitting fluid supply to said support means responsive to said input.

4,694,521
HUMAN BODY SUPPORTING DEVICE

Hiroshi Tominaga, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd, Kanagawa, Japan

Filed Jun. 19, 1986, Ser. No. 876,111
Claims priority, application Japan, Jun. 19, 1985, 60-133739
The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.
Int. Cl.[4] A61G 7/00; A47C 27/08
U.S. Cl. 5—453 6 Claims



1. A human body supporting device comprising:

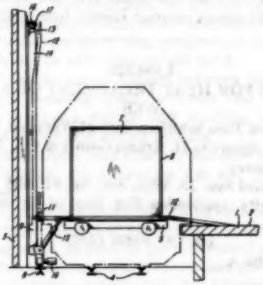
a mat for receiving the body, the mat including an upper layer of porous elastic material having fine particles mixed therein and a lower layer of porous elastic material; and

means for blowing air through said mat from said lower layer to said upper layer such that the blowing air suspends said particles in said upper layer.

4,694,522
TRANSFER BRIDGE

Kurt Alten, Ringstr. 14, D-3015 Wennigsen, Fed. Rep. of Germany

Filed Feb. 26, 1986, Ser. No. 833,900
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506723
Int. Cl.[4] B65G 11/12, 11/18
U.S. Cl. 14—71.1 4 Claims



1. A transfer bridge for bridging across railroad tracks; said transfer bridge including a bridge plate that has a free end and that is pivotably mounted on one side of the tracks in such a way that it can be pivoted about a horizontal pivot axis between an approximately vertical rest position, and an approximately horizontal operative position in which the free end of the bridge plate rests on a platform located on the opposite side of the tracks remote from that one side of the tracks where said bridge plate is pivotally mounted; said transfer bridge further comprising:

a first guide rail means disposed on that side of said tracks remote from said platform, with said first guide rail means extending parallel to said tracks;

a travel mechanism movably disposed on said first guide rail means in such a way that it is movable parallel to said tracks; the pivotable mounting of said bridge plate being effected by pivotably mounting the latter on said travel mechanism;

boom means connected to said travel mechanism and extending upwardly therefrom away from said first guide rail means;

second guide rail means disposed above said horizontal pivot axis for holding said boom means in such a way that the latter cannot tilt;

said boom means including a separate boom on each side of said bridge plate, when viewed from said platform, and a horizontal crosspiece for connecting said booms;

said crosspiece being disposed at a height corresponding approximately to the height of that end of said bridge plate remote from said horizontal pivot axis when said bridge plate is in its vertical rest position;

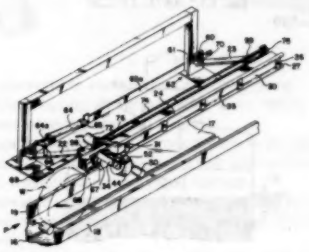
said travel mechanism, said two separate booms, and said crosspiece rigid frame defining a plane;

said bridge plate, when in its vertical rest position, being essentially disposed with said frame, i.e. within the plane defined by said frame.

4,694,523
TIRE SCRUBBING MACHINE FOR AUTOMATIC CAR WASHERS

Russel A. Van Brakel, Oneida County, Wis., assignor to Haverberg Auto Laundry Equipment Company, Chicago, Ill.

Filed Feb. 14, 1986, Ser. No. 830,054
Int. Cl.[4] B60S 3/06
U.S. Cl. 15—53 B 13 Claims



1. Scrubbing apparatus for scrubbing the outer sidewalls of the tires on the wheels located on one side of a motor vehicle being pulled by a conveyor through a washing facility along a vehicle path having an entry and an exit, said apparatus comprising:

an elongated frame providing a track generally parallel to said vehicle path;

a carriage movable along the track between a start position and a finish position, which is closer to the vehicle path exit than is the start position;

mounting means for the frame making it movable forwardly toward and rearwardly away from the vehicle path between a retracted position and an active position, whereat the start position of the carriage is closer than the finish position thereof is to the entry of the vehicle;

a brush rotatably mounted on the carriage and projecting forwardly toward the vehicle path;

a brush contact limiting device carried by the carriage and projecting forwardly toward the vehicle path less than the brush projects;

a pickup arm device on the carriage projecting further than the brush projects so as to be engaged by the tread of a tire on a wheel of a vehicle moving along the vehicle path and

position the brush and brush contact limiting device opposite the outer sidewall of the tire;

a stop arranged to be engaged by the carriage when the carriage is at its start position and the frame is in an intermediate position between its retracted and active positions, said stop being located such as to permit the carriage to advance along the track while preventing the frame from moving from its intermediate position forwardly toward its active position until the carriage is advanced toward its finish position from its start position by way of being pushed by action of a wheel on a vehicle advancing along the vehicle path and engaging the pickup arm device with the tread face of its tire, said intermediate position being far enough from the vehicle path to prevent the control device and brush from being engaged by such tread face when the frame occupies the intermediate position;

frame moving means urging the frame forwardly toward its active position when the carriage occupies its start position and urging the frame to move rearwardly toward its retracted position when the carriage occupies its finish position;

motor means on the carriage for rotating the brush as the carriage travels from its start position to its finish position; and

carriage return means on the frame for moving the carriage from its finish position to its start position when the frame is in its retracted position.

4,694,524

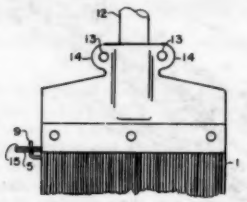
CLAMPING HEAD FOR REPLACEABLE STRING MOP

Kwan C. Kim, P.O. Box 48 (133 Mauna Kea St.), Hilo, Hi. 96721

Continuation-in-part of Ser. No. 696,442, Jan. 30, 1985, abandoned. This application Apr. 17, 1986, Ser. No. 854,659

Int. Cl.[4] A47L *13/258*

U.S. Cl. 15—150 **3 Claims**



1. A clamping head for replaceable string mop elements comprising:

a. a mop handle;

b. a mop base operably attached to one end of said mop handle;

c. a longitudinal T-slot socket member disposed transverse to the mop handle, said socket member operably attached to said mop base;

d. a clamped mop assembly comprised of a string mop, the strings of which are bound together midway of their lengths and a clamp means comprised of a pair of parallel, opposed clamping members the bound portion of said string mop being clamped between and by said parrallel opposed clamping members;

e. said clamp means defining a longitudinal T-slot engaging flange member selectively attached to said mop base member by engagement with said longitudinal T-slot socket member;

f. a catch operably attached to said mop base releasably locking said longitudinal T-slot engaging flange member in said longitudinal T-slot socket member whereby a worn out and dirty clamped mop assembly may be readily removed by hand from the socket in the mop base by first releasing said catch, holding onto the clamp with one hand and the mop handle of base with the other hand without touching the dirty mop, the old clamped mop assembly discarded, and a new clamped mop assembly inserted and locked into the mop base all without getting the hands dirty.

4,694,525

HAIRBRUSH

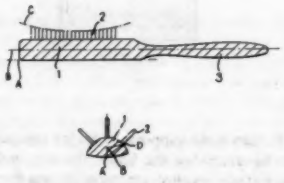
Hiromi Yamamoto, Sakura; Miho Imai, Ichikawa, and Noboru Suzuki, Tokyo, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Sep. 30, 1985, Ser. No. 782,248

Claims priority, application Japan, Oct. 8, 1984, 59-152133[U]

Int. Cl.[4] A46B *9/02*

U.S. Cl. 15—160 **7 Claims**



1. A hairbrush, comprising a base and a plurality of bristles, said base including an implantation portion on which said bristles are supported and an elongate grip portion projecting outwardly from said implantation portion; wherein said bristles extend generally radially outwardly with respect to a center axis and, viewed in a cross-sectional plane of said implantation portion perpendicular to said center axis, have tips at outer ends thereof which define an arcuate curve substantially concentric to said center axis; wherein said tips of said bristles, viewed in a cross-sectional plane of said implantation portion containing said center axis, define an arcuate curve having a centerpoint on a side of said bristle tips remote from said base; and wherein said grip portion has an axis of rotation which extends centrally longitudinally therethrough, which is parallel to said center axis, and which is spaced by a distance in the range of 5 to 15 mm from said center axis, said center axis being on a side of said axis of rotation remote from said bristles.

4,694,526

APPARATUS FOR HEAT TREATMENT OF A TEXTILE WEB

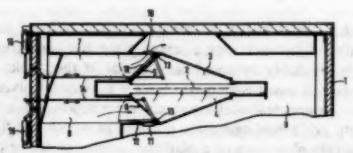
Karl Grafen, and Theo Schiffers, both of Würselen, Fed. Rep. of Germany, assignors to H. Krantz GmbH & Co., Aachen, Fed. Rep. of Germany

Filed Sep. 23, 1986, Ser. No. 910,486

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535421

Int. Cl.[4] F26B *13/02*

U.S. Cl. 15—306 A **8 Claims**



1. In an apparatus for the treatment of a textile web supported on a tenter with a heated treatment medium, said apparatus including ventilator means having a suction and compres-

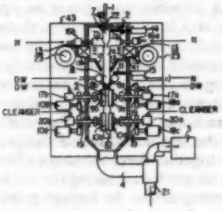
sion side, a distribution space connected to said compression side, a collection space connected to said suction side, and a nozzle box vented to said collection space, said nozzle box including treatment openings directed toward said web, the improvement which comprises a first inlet opening leading from said distribution space into said nozzle box, a by-pass opening leading from said distribution space into said collection space, the cross sectional area of said by-pass opening being substantially equal to the combined cross sectional areas of said treatment openings, said inlet opening being disposed adjacent said by-pass opening, and a common register member movably mounted adjacent said inlet and by-pass openings and adapted to be shifted alternatively into closing position of one or the other of said openings.

4,694,527

MASK WASHING APPARATUS FOR PRODUCTION OF INTEGRATED CIRCUIT

Takeshi Yoshizawa, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Jul. 3, 1984, Ser. No. 627,578
Claims priority, application Japan, Jul. 6, 1983, 58-122706
Int. Cl.[4] B08B *1/04*
U.S. Cl. 15—308 **6 Claims**



1. A mask washing apparatus for fabricating semiconductor devices comprising:

a vertical, airtight chamber comprising a washing space for washing the mask and a drying space for drying said mask, wherein said drying space is positioned at an upper part of said chamber, and said washing space is positioned at a lower part of said chamber;

a first shutter means located on the top of said chamber, wherein said first shutter means is closed during the washing process and the drying process and is opened during the loading or unloading of said mask;

a second shutter means located between said drying space and said washing space, wherein said second shutter means is closed during said washing process, and is opened during said drying process;

a drain and exhaust duct means, positioned at the bottom of said chamber, for exhausting gas and water from said chamber;

a gas jet type drying means for drying said mask, said drying means being positioned below said first shutter means, and emitting a flat jet flow of gas downward on both sides of the substrate to be dried, wherein said gas jet type drying means includes at least two flat nozzles positioned on either side of the substrate to be dried, wherein the upper sides of said flat nozzles are provided with cover plates extending downward close to the surface of said substrate, and is inclined to the surface of said substrate at an angle of 50° to 60°, the lower sides of said flat nozzles and said cover plates providing an orifice therebetween to provide the flat gas flow;

air flow means positioned underneath said gas jet type drying means for providing clean air flow beneath said drying means and towards the surface of the substrate to be dried, said air flow means including an air inlet means for taking in air into said airtight chamber, filter means for filterining the intake air, and a fan means for forming a stream of clean air, wherein said air flow means prevents dust or water mist from being dragged into said gas jet type dryer means; and

washing means, positioned in said washing space for washing the mask,

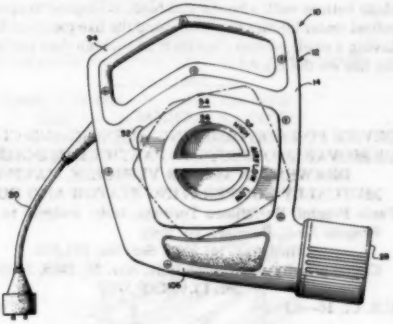
wherein an air stream flowing from the top to the bottom of said chamber is produced during the washing process and the drying process, said air stream flow preventing washed out dust or water mist from the cleaned surface of the washed substrate from being recycled.

4,694,528

CONVERTIBLE VACUUM-BLOWER

Robert C. Comer, Hopkins; Wilbur J. Hampel, Spring Park, and Edward A. Rogers, Minneapolis, all of Minn., assignors to The Toro Company, Minneapolis, Minn.

Filed Jul. 18, 1986, Ser. No. 886,815
Int. Cl.[4] B02C *18/06*
U.S. Cl. 15—330 **17 Claims**



1. A convertible vacuum-blower comprising:

a housing having an air inlet and an air outlet;

a motor supported in said housing;

an impeller supported for rotary motion in said housing, in fluid communication with said air inlet and said air outlet, and rotatably driven by said motor;

a removable air inlet cover for covering said air inlet, said air inlet cover having apertures for passage of air through the cover;

attachment means for removably securing said air inlet cover to said housing;

switch means carried by said housing for allowing said motor to operate when said air inlet is covered but not when said air inlet is uncovered; and

first switch actuator means carried by said air inlet cover for actuating said switch means when said cover is secured to said housing covering said air inlet.

4,694,529

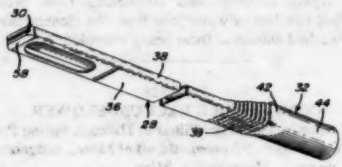
SUCTION DEVICE

Rémi Choiniere, 464 Rachel Street, Granby, Canada (J2G 1B6)

Filed May 6, 1986, Ser. No. 860,215
Int. Cl.[4] A47L *9/02*
U.S. Cl. 15—393 **6 Claims**

1. A suction device made of a tubular semi-rigid material and consisting of a main elongated, thin hollow, longitudinally-flexible blade and an enlarged open socket freely communicating with the rear end of said blade: the blade having a front wall provided with a slit and cross-sectionally rectangular to define top, bottom and side walls: the socket having a cross-sectionally quadrangular portion adjacent said blade and a cross-sectionally circular portion at its rear end portion, so as to be adapted to be removably engaged by the cylindrical

suction tube of a vacuum cleaner, the longitudinal axes of said blade and socket being substantially parallel said socket being longitudinally-upwardly-offset relative to said blade with said enlarged socket cross-sectionally quadrangular portion defines a bottom wall coplanar with both the plane tangent to the bottom edge of said socket cross-sectionally circular portion



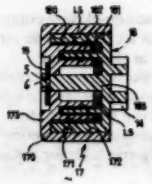
and with said blade bottom wall; a front end portion of the blade bottom wall having an elongated aperture and members at both ends of said aperture downwardly protruding from said blade bottom wall, wherein said blade is adapted to operatively extend under kitchen appliances and the like pieces of furniture having a small ground clearance, to suck up dust particles and the like on the floor.

4,694,530

DEVICE FOR CONTROLLING OPENING AND CLOSING OF MOVABLE OBJECTS, IN PARTICULAR DOORS AND DRAWERS IN MOTOR VEHICLES, HAVING MUTUALLY COOPERATING STATOR AND ROTOR

Paolo Foggini, Revigliasco Torinese, Italy, assignor to Foggini Progetti S.r.l., Beinasco To, Italy

Filed Apr. 14, 1986, Ser. No. 851,575
Claims priority, application Italy, Apr. 24, 1985, 53304/85[U]
Int. Cl.[4] E05F *5/02*
U.S. Cl. 16—82 **4 Claims**



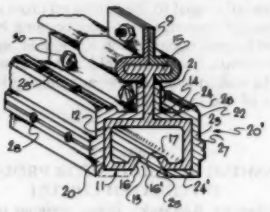
1. A device for controlling opening and closing of movable objects, in particular doors and drawers in motor vehicles, comprising a stator; a rotor rotatable and effecting angular displacements relatively to said stator, said stator being a bell-like stator with stator concentric cylinders and said rotor having rotor concentric cylinders interposed between said stator concentric cylinders; a straight groove formed on one of said stator concentric cylinders; a profiled groove formed on one of said rotor concentric cylinders and partially facing said straight groove, said profiled groove forming at least first and second groove portions arranged in parallel to each other and having first and second common ends; a cam formed on said one of said rotor concentric cylinders between said first and second groove portions; a high density fluid defining solid lubricant interposed between said stator and rotor concentric cylinders; locking and releasing means for controlling relative motion of said stator and rotor and being engageable and disengageable through said angular displacements of said rotor relatively to said stator, said locking and releasing means including a ball engaged in said straight groove of said stator and being biased by said profiled groove in said rotor, said first and second groove portion respectively defining a forward and a return path for said ball.

4,694,531

SUSPENDED OVERHEAD HOLLOW TRACK SUPPORT SYSTEM

Peter S. Foy, 4345 Topaz St., Las Vegas, Nev. 89121

Filed Sep. 30, 1985, Ser. No. 781,335
Int. Cl.[4] A47H *1/04*
U.S. Cl. 16—87.4 R **1 Claim**



1. An overhead track support system comprising a plurality of one-piece elongate track members of uniform cross-section and a plurality of splice plates of configured uniform cross-section which fit closely about an outer profile of a track member, each said track member comprising an open ended hollow section having at a lower side a central open slot extending lengthwise and from end-to-end of the member, and at an upper side a centrally located and upwardly extending upright flange extending lengthwise and from end-to-end of the member and having an upper free end, said upright flange being formed with an upper transverse flange element on the free end, wherein the upper transverse flange element and said upright flange together form the shape of a T;

a suspended hanger for mounting the track member comprising a clamping device for engaging with and coupling to the upper transverse flange element;

each said splice plate being a one-piece identically shaped profiled member of uniform cross section throughout its length;

said profiled member having a U-shaped channel section including an upright web separating a pair of transverse flanges arranged in parallel spaced apart relationship one above the other to define an upper transverse flange and a lower transverse flange in fixed spaced apart relationship to define a cavity conformal with the hollow section of the track member;

an upwardly extending connection flange carried on the end of said upper transverse flange extending parallel to and laterally of said upright web;

said lower transverse flange terminating at its free edge with an upwardly directed chamfer;

said lower transverse flange extends from said web in a lesser dimensioned distance than said upper flange;

thickening ribs of trapezoidal cross section integrally carried externally of said U-shaped channel along said upper flange adjacent said web and along said web at its mid-section between said upper and said lower transverse flanges;

attachment holes provided in said connection flange and said web rib;

fasteners insertably received in said attachment holes for bearing against the upright flange and the hollow section of the track member in releasable securement therewith;

each said splice plate comprising a high strength-to-weight ratio material;

each said splice plate being of shorter length than the track member and overlapping abutting opposing ends of the tack members;

each said splice plate fits in close relationship about the track member with the connection flange abutting the upright flange of the track member and the channel section closely fitting about the holow section of the track member, whereby a pair of said track members may be secured in end-to-end relationship by securing a pair of said splice

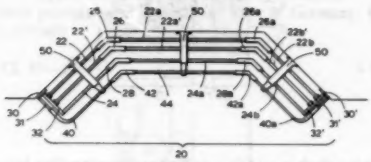
plates in overlapping relationship with respect to abutted ends of the track member and at opposite sides thereof.

4,694,532

ROD SUPPORT SYSTEM HAVING END BRACKETS AND AUXILIARY SUPPORT BRACKETS

Alee R. Black, 403 N. 24th St., East St. Louis, Ill. 62205

Filed Oct. 28, 1985, Ser. No. 792,217
Int. Cl.[4] A47H *1/142*
U.S. Cl. 16—94 D **4 Claims**



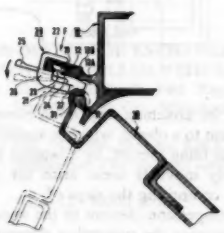
1. A combination drapery, curtain and, valance suspension system consisting of two end brackets each having a wall mounted segment, a valance rod support segment, and a slidably mated two-piece rod support segment comprised of a support arm and an extender arm which has a plurality of rod support sockets affixed thereto, wherein said valance rod support segment and said slidably mated two-piece rod support segment extend outwardly from said wall mounted segment, a traverse rod assembly consisting of a plurality of straight and elbowed traverse rods mounted in a corresponding number of said rod support sockets, a plurality of curtain rod assemblies consisting of a plurality of straight and elbowed curtain rods mounted in the remaining rod support sockets, a valance rod assembly consisting of a plurality of curved, elbowed, and straight valance rods mounted on said valance rod support segment, and a plurality of two-piece slidably mated auxiliary support brackets each having a wall mounted segment and a mating rod support segment having a plurality of rod support stirrups on a bottom side thereof and a valence rod support stirrup on a top side thereof, said auxiliary support brackets positioned at intermediate points and supporting said traverse, curtain, and valance rods at said intermediate points.

4,694,533

HINGE AND SECTIONAL PANELS ON A FRAME ENABLING ASSEMBLY AND DISASSEMBLY THEREOF

Gérard Doyen, Beuvrages, France, assignor to Alsthom, Paris, France

Filed Sep. 15, 1986, Ser. No. 907,343
Claims priority, application France, Sep. 23, 1985, 85 14069
Int. Cl.[4] E05D *7/10*
U.S. Cl. 16—257 **1 Claim**



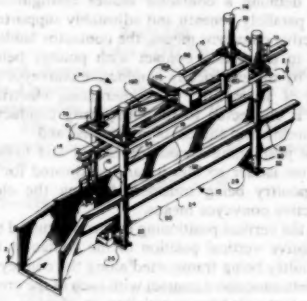
1. A hinge comprising, in combination, a sectional panel, a frame, said frame including a projecting lip of semicircular cross section forming a swivel pin and an integral projecting part extending generally in the same direction as the lip and being spaced therefrom, a sectional panel terminating at one end in a semicircular trough engaging said lip and forming a hinge connection therewith, and at least one retaining member installed on said projecting part, said projecting part including a groove on a face thereof proximate to said lip, said retaining member including a C-shaped lug, enveloping the end of said projecting part, said retaining member including a body having a concave rounded edge abutting said semicircular trough and further including an integral flexible blade extending along a face of said part proximate to said lip and including a catch facing said groove and being snap fitted into said groove by deflection of said flexible blade during engagement of the C-shaped lug with the end of the projecting part of said frame, wherein said flexible blade extends beyond the C-shaped lug, to define a hand releasing tab for forceably deflecting said flexible blade to release said catch from said groove, and wherein said retaining member body is cut out at its center and said flexible blade projects through said cutout from the rounded concave edge of said retaining member body to beyond said C-shaped lug.

4,694,534

APPARATUS FOR ELECTRICALLY STUNNING POULTRY

Lacy Simmons, P.O. Box 546, Dallas, Ga. 30132

Filed Jan. 23, 1986, Ser. No. 821,912
Int. Cl.[4] A22B *3/06*; A22C *21/00*
U.S. Cl. 17—1 E **8 Claims**



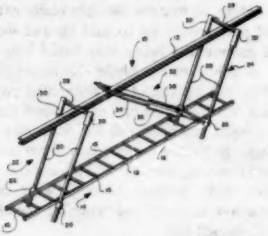
1. A stunner for poultry and the like comprising an elongate trough; the trough having a bottom, outwardly and upwardly flaring side walls and an end wall and an entrance, all defined to contain a relatively small quantity of an electrolytic solution, said wall terminating with a lip means adapted to overlie said electrolytic solution, said entrance including an upwardly and inwardly sloping floor, said entrance also including inwardly and outwardly flared side walls, said end wall defining a small height thereby permitting egress from said trough between said side outwardly and upwardly flaring walls, said trough having an elongated horizontal grid spaced from the bottom thereof and sloping upwardly in the direction of said end wall whereby in use the portion of said grid which slopes upwardly is not immersed in said electrolytic solution, said trough mounted to a plurality of upwardly extending means, said means terminating in upwardly extending threaded means, a carriage means displaced vertically over said trough, means mounted on said carriage means adapted and constructed to operatively act on said threaded means, said means mounted on said carriage means adapted and constructed to selectively rotate on said upwardly extending threaded means whereby said carriage means when said carriage means operates to increase or decrease the distance between said trough and said carriage means.

4,694,535

POST STUNNER FOR POULTRY

Lacy Simmons, P.O. Box 546, Dallas, Ga. 30132

Filed Jun. 2, 1986, Ser. No. 869,322
Int. Cl.[4] A22C *21/00, 3/06*
U.S. Cl. 17—1 E 12 Claims



1. A post stunner for delivering a plurality of electric shocks to poultry, after the poultry has passed through a killer station wherein the throat of the poultry is cut for bleeding the poultry comprising:

an electrically conductive conveyor means to which poultry can be secured and along which poultry is conveyed to various processing stations;

a plurality of electrically spaced conductive cross bars arranged perpendicular to the direction of the conveyor means defining a contactor ladder configuration positioned parallely beneath and adjustably supported by the conductive conveyor means, the contactor ladder is positioned to come into contact with poultry being transported by the electrically conductive conveyor means;

a source of about fifty volts alternating electric energy which is connected to the electrically conductive conveyor means and the contactor ladder; and

a vertical positioning means for raising and lowering the contactor ladder so that it can be adjusted for different sized poultry being transported along the electrically conductive conveyor means,

whereby the vertical positioning means is actuated to change the relative vertical position of the contactor ladder so that poultry being transported along the conveyor means come into successive contact with each of the cross bars of the contactor ladder completing an electric circuit between each said cross bar and the conveyor means, thereby providing the poultry with a plurality of spaced electric shocks, immobilizing the poultry and promoting increased blood flow.

4,694,536

COMPOUND PUMP MECHANISM FOR MEAT ENCASING MACHINES AND THE LIKE

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Filed Dec. 15, 1986, Ser. No. 941,376
Int. Cl.[4] A22C *11/08*
U.S. Cl. 17—37 24 Claims

1. A compound pump mechanism, comprising,

a first pump housing,

a first pump mechanism in said first pump housing,

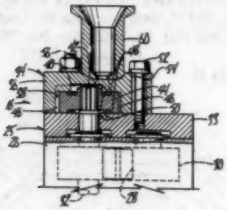
inlet and outlet ports in said first pump housing in communication with said first pump mechanism for delivering to and from said first pump housing the material to be pumped,

a drive shaft in said first pump housing and connected to a source of rotational power and to said first pump mechanism to cause said first pump mechanism to pump material delivered to said inlet port through said first pump mechanism and out said outlet port,

a second pump housing mounted on said first pump housing,

a second pump mechanism in said second pump housing,

inlet and outlet ports in said second pump housing in communication with said second pump mechanism for delivering to and from said second pump housing the material to be pumped,



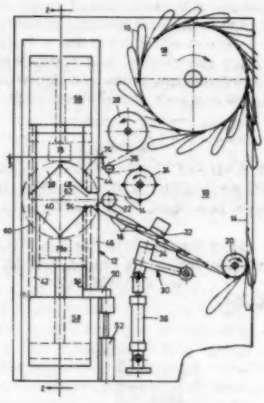
said drive shaft in said first pump housing extending into said second pump housing and connected to said second pump mechanism, whereby rotation of said drive shaft will operate both said first and second pump mechanisms.

4,694,537

PROCESS AND DEVICE FOR THE FIXTURE OF SUSPENSION ELEMENTS TO SAUSAGES

Günter Kollross, Am Wallerstädter weg 20, D-6080 Gross Gerau-Dornheim, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 759,137
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430030923
Int. Cl.[4] A22C *11/12*
U.S. Cl. 17—49 15 Claims



1. A method for attaching suspension elements to sausages by attaching them to a clamp, which is applied to the end of a sausage after the filing thereof, by a sausage constricting tool having relatively movable shear arms for constricting the sausage sheath, comprising the steps of:

delivering a suspension element to the sausage constricting tool and grasping the suspension element by the sausage constricting tool at a grasped position before the filling of the sausage to which that suspension element is to be attached,

and then guiding the suspension element from the grasped position to the longitudinal axis of the sausage, as the sausage constricting tool operates to constrict the sausage,

and enclosing the suspension element together with the sausage sheath with the clamp.

4,694,538

FEED APPARATUS FOR CARDS, CARDING ENGINES, AND THE LIKE

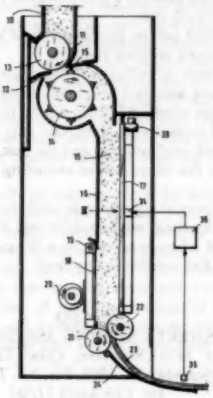
Akiva Pinto, Gastonia, N.C., and Guenter Lucassen, Haltern, Fed. Rep. of Germany, assignors to Hergeth Hollingsworth GmbH, Duelmen, Fed. Rep. of Germany

Continuation of Ser. No. 657,844, Oct. 4, 1984, abandoned. This application May 2, 1986, Ser. No. 858,626

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1983, 3336654

Int. Cl.[4] D01G *15/40*

U.S. Cl. 19—105 **9 Claims**



1. Feed apparatus for cards, carding engines and the like, including a substantially vertical shaftway defined at least in part by two side walls and two end wall flanges, the improvement comprising:

one of said side walls being formed of a resilient deformable member which is deformable in the widthwise direction of said vertical shaftway thereby enabling the distance between the two side walls to vary along the widthwise direction of said vertical shaftway, wherein said one side wall is fastened to a carrying part by holding means by which said deformable member is displaceable transversely of said shaftway; and edge seal means carried by opposing edges of said deformable member contacting with said end wall flanges in a manner that said opposing edges may move in sliding contact with said wall flanges when said deformable member is displaced transversely.

4,694,539

METHOD AND DEVICE FOR EXCHANGING EMPTY CANS WITH CANS FILLED WITH SLIVER

Manfred Langen, Mönchengladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Mönchengladbach, Fed. Rep. of Germany

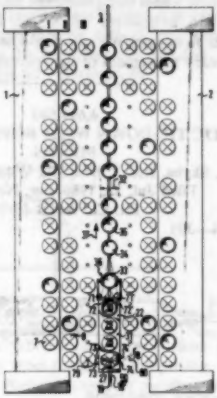
Filed Feb. 14, 1986, Ser. No. 829,534

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1985, 3505494

Int. Cl.[4] B65H *67/02*

U.S. Cl. 19—159 A **14 Claims**

1. Method of exchanging empty cans with cans filled with sliver at a spinning machine having set locations for the cans wherein a mobile transport device is automatically driven along a floorlike travel path at the spinning machine, which comprises placing empty cans on the travel path, successively placing filled cans entrained with the transport device automatically at set locations of the machine which are unoccupied, picking up the empty cans on the travel path automatically with the transport device, and driving the transport device automatically back to a loading station, when the transport device is too full to pick up any more cans, so as to surrender the empty cans and pick up filled cans at the loading station preparatory to driving the transport device back to the spinning machine.



4,694,540

CAN COILER

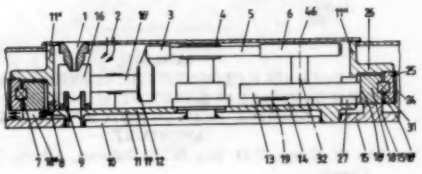
Albert Rosink, deceased, late of Nordhorn, Fed. Rep. of Germany by Lieselotte Rosink, heiress, assignor to Albert Rosink Maschinenbau, Nordhorn, Fed. Rep. of Germany

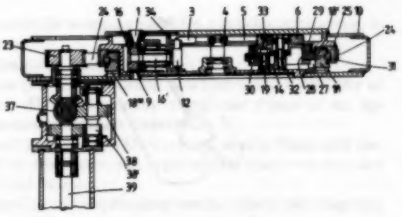
Filed Sep. 17, 1985, Ser. No. 776,944

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1984, 3434228

Int. Cl.[4] B65H *54/80*

U.S. Cl. 19—159 R **13 Claims**





1. In a can coiler with sliver inlet opening on a head side thereof, said opening being in a rotating plate and being flanked by calender rolls, the latter being driven by rotary movement of the rotating plate in a head of the can coiler, the improvement comprising

gearless means for driving the calender rolls by said rotary movement of the rotating plate,

said means comprises a belt drive and a friction wheel drivably connected to the belt drive,

said friction wheel being shiftably mounted so as to be shiftable into a position of rolling frictional engagement against an annular surface of said head of the can coiler by the rotary movement of the rotating plate.

4,694,541

ELASTIC TIE-DOWN WITH ROPE ADJUSTMENT MEANS

Helmut K. Skyba, Rte. 2, Box 330, Wild Rose, Wis. 54984

Filed Jul. 23, 1986, Ser. No. 888,337

Int. Cl.[4] A44B *13/02*

U.S. Cl. 24—301 **10 Claims**

1. A tie-down comprising:

a. a flexible rope having first and second ends and a pair of spaced abutment means on the rope between the two ends; and

b. an elastic sleeve placed over the rope intermediate the rope ends, and encapsulating and concealing said abutment means enlargements, the sleeve length being less than the spacing between the rope abutment means to create a rope slack inside the sleeve, the sleeve being crimped tightly at the ends thereof over the rope to grip the rope and capture said abutment means and rope slack between the sleeve ends and to create rope first and second ends extending oppositely from the ends of the sleeve and having sufficient length to afford connection of said rope ends for rope usage,

so that applying tension to the rope ends causes said abutment means to cause tension on said elastic sleeve to stretch and thereby impart elastic qualities to the tie-down.

4,694,542

FOLDABLE CLOSURE FOR FLEXIBLE BAGS COMPRISING FLAT SHEET WITH INTEGRAL AXIAL HINGE GROOVE, LEAD IN NOTCH, AND GRIPPING APERTURE

Lou W. Koppe, P.O. Box 567, Athabasca, Alberta T0G 0B0, Canada

Filed Feb. 14, 1986, Ser. No. 829,711

Int. Cl.[4] B65D *77/10*

U.S. Cl. 24—30.5 S **9 Claims**

1. A bag closure comprising:

a flat sheet of material,

said sheet having a lead-in notch extending into said sheet from one edge thereof,

said sheet having only a single aperture extending therethrough adjacent to and communicating with said notch via a passageway which is narrower than said aperture,

said passageway being shaped so that said notch extends into said aperture with the material of said sheet forming a base of said notch and also forming a pair of points projecting into said aperture,

said sheet having an integral hinge along an axis which intersects said notch and said aperture, said hinge comprising a groove along said axis extending partially through said sheet from one side thereof along a straight line from an edge of said aperture opposite said passageway to an edge of said sheet opposite said one edge thereof,

said sheet of material being wide enough, in a direction perpendicular to said axis and parallel to said sheet, to be graspable with the fingers os that it can be bent along said axis, and

said sheet being made of a non-frangible material and having properties such that:

(a) said sheet can be repeatedly bent along said axis and straightened without fracture,

(b) said sheet is sufficiently rigid such that when bent along said axis, said sheet will assume a V-shaped configuration when seen from an end thereof in a direction parallel to said axis, with said axis at the base of said V-shaped configuration and the rest of said sheet forming two flat hinge leaves extending up from said axis, and

(c) when bent along said axis, said sheet will assume and remain by itself indefinitely in said V-shaped configuration and when bent back to a flat configuration, it will remain flat indefinitely by itself.

4,694,543

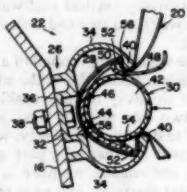
SHEET GRIPPING ASSEMBLY

John L. Conley, 3870 Chino Ave., Chino, Calif. 91710

Filed May 28, 1985, Ser. No. 738,276

Int. Cl.[4] A44B *21/00*

U.S. Cl. 24—461 **2 Claims**



1. A sheet gripping assembly for thin pliable sheet material, such as plastic film, comprising:

a relatively rigid base channel including laterally curved longitudinal side walls having longitudinal edge portions which curve toward one another and a longitudinal cavity opening laterally through a side opening between and bounded by longitudinal sheet gripping edges on said side wall edge portions, said gripping edges defining a plane

an elongate innerlock member including a laterally flexible channel portion having an open side between longitudinal edges of the channel portion, and a lip joined to the inner side of said channel portion adjacent but spaced from one longitudinal edge thereof and extending outwardly through and well beyond the plane of said open side of said channel portion,

an elongate cylindrical gripping bar having a diameter greater than the width of said base channel side opening and sized to fit within said innerlock channel portion with the bar protruding through the open side of the channel portion between and bearing against said lip and the opposite side of said channel portion to resist lateral deflection of said innerlock edges toward one another,

said gripping bar and innerlock member being resilient, whereby said innerlock member and gripping bar are laterally insertable into said base channel cavity through said side opening thereof along with the sheet material to be secured and to assembled positions within said base channel cavity wherein said innerlock channel portion opens toward said base channel side opening, said longitudinal edges of said innerlock channel portion abut the inner side of said base channel side wall edge portions adjacent said gripping edges thereof, said innerlock lip projects through said base channel side opening adjacent one base channel gripping edge and then well beyond the plane of said base channel side opening, said gripping bar is positioned within and protrudes from said innerlock channel portion toward said base channel side opening to resist lateral deflection of said channel portion edges toward one another, and the sheet material enters said base channel between said innerlock lip and the adjacent base channel gripping edge and then passes around the innermost side of said innerlock member between the latter and said base channel and finally emerges from said base channel between said gripping bar and the other base channel gripping edge for gripping of the sheet material between said lip and the adjacent base channel gripping edge on the one hand and between said gripping bar and the other base channel gripping edge on the other hand, and

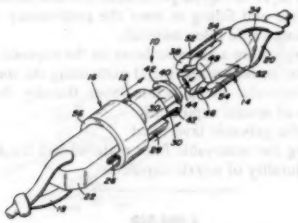
the outer extremity of said innerlock lip being well spaced from sheet material gripped by said sheet gripping assembly so as to be readily accessible to receive finger pressure for laterally contracting said innerlock channel portion to facilitate insertion and removal of the innerlock member into and from said base channel and for shielding the adjacent portion of said sheet material against direct contact with said gripping bar during insertion and removal of the latter into and from the base channel.

4,694,544

RELEASABLE CONNECTOR

Jon Chapman, 5968 Via Lemora, Goleta, Calif. 93117

Filed Aug. 22, 1986, Ser. No. 899,150
Int. Cl.[4] A41F *1/00*; A43C *11/00*
U.S. Cl. 24—625 **9 Claims**



1. A releasable connector comprising:

a male member having two prongs terminating in normally spaced apart prong ends;

a tubular female member having an open end dimensioned for axially receiving said prong ends, said tubular member being divided at said open end into at least three legs by axially extending slots;

said prong ends being resiliently compressible towards each other for insertion into said female member, said prong ends returning to said normal position within and interlocking with said female member to prevent separation of said male and female members, said prong ends being disengagable from said female member upon squeezing together of said prongs; and

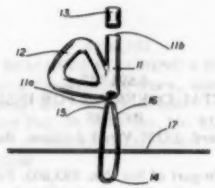
unitary locking means removably interposable between said interlocked prong ends for securing said male and female members in mating engagement, and with an annular coextensive portion thereof for bridging the joint interface between the interlocked male and female members.

4,694,545

ATTACHMENT OF RINGS WITHOUT SEWING

David Dernis, 13321 SW. 80th St., Miami, Fla. 33183

Filed Dec. 10, 1985, Ser. No. 807,449
Int. Cl.[4] B21D *37/04*
U.S. Cl. 29—1 R **2 Claims**



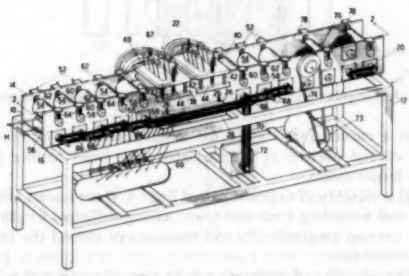
1. A device which when attached to a sheet provides a closed loop depending from the sheet, comprising: the combination of a U-shaped filament, a tubular member and filament holding means; said tubular member having a closed loop portion attached thereto; the legs of said filament being adapted to pass through the sheet and into said tubular member; said holding means being adapted to hold the filament legs in position on said tubular member.

4,694,546

APPARATUS FOR STRIPPING PAINT

Kirk A. Rawlings, Wausau, Wis., assignor to Wausau Metals Corporation, Wausau, Wis.

Filed Dec. 5, 1985, Ser. No. 804,781
Int. Cl.[4] B21C *43/00*
U.S. Cl. 29—81 D **10 Claims**



2. Apparatus for stripping paint from articles comprising, in combination:

(a) an elongated frame (12),

(b) means (56) for supporting and conveying a plurality of articles (H) longitudinally along said frame in an upstream-to-downstream direction,

(c) a horizontal platen (32) mounted to said frame and disposed so that conveyed articles pass thereover and are supported thereby,

(d) a plurality of reciprocating needle chisels (48) disposed above said platen for striking articles as they pass over said platen to thereby remove paint therefrom,

(e) means (26, 28, 30) adjustably mounting said platen (32) to said frame,

(f) damper means (34) supporting said platen,

(g) and downwardly canted end means on said platen to

cause an article approaching the latter to ride up thereonto.

4,694,547

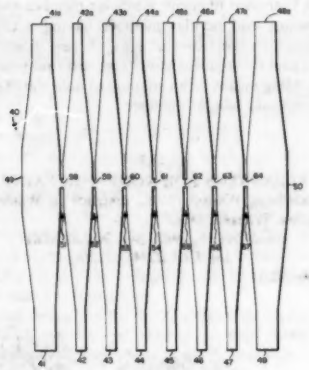
ONE-PIECE METAL COVERING FOR INSULATED PIPE BENDS

Edison L. Broussard, 13327 Virgil Jackson, Baton Rouge, La. 70818-2050

Continuation-in-part of Ser. No. 583,603, Feb. 27, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 828,443

Int. Cl.[4] **B21D** *53/00;* **F22B** *7/18;* **F16L** *43/00*

U.S. Cl. 29—157 R **34 Claims**



1. A one-piece metal jacket for insulated pipe bends comprising:

(a) a curved metal spine for longitudinally covering the curved portion of the insulated pipe bend having the larger radius,

(b) a plurality of opposed paired fingers, spaced apart along and extending from said spine, having sufficient length to overlap longitudinally and transversely around the insulated pipe,

(c) a plurality of connecting links formed along said spine and between the spaced apart fingers, separating one pair of said opposed paired fingers from another pair, and

(d) fastener means to hold said fingers in fixed position, whereby the portion of said spine between adjacent, spaced apart opposed pairs of fingers and forming said connecting link, in use, folds back upon said spine overlapping the next adjacent pair of opposed fingers along their sides in weatherproofing fashion.

22. A method of covering an insulated pipe bend which comprises applying the one-piece metal jacket of claim **1** to said bend, temporarily fastening the first opposed pair of metal fingers at one end and then bending the connecting link back upon the metal spine and folding the next adjacent pair of metal fingers about said insulated pipe bend in overlapping and weatherproofing fashion continuing until the last pair of metal fingers is folded and secured temporarily and thereafter securely fastening each of said metal fingers.

4,694,548

METHOD FOR PRODUCING A SPINNING NOZZLE PLATE

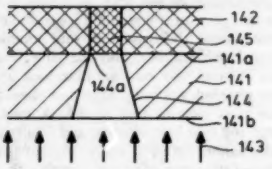
Wolfgang Ehrfeld, Karlsruhe, and Peter Hagmann, Leopoldshafen, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Jul. 9, 1986, Ser. No. 883,633

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1985, 3524411

Int. Cl.[4] **B21D** *53/00;* **G03C** *5/00;* **C25D** *1/08*

U.S. Cl. 29—157 C **21 Claims**



1. A method for producing a spinning nozzle plate having funnel-shaped preliminary channels in flow communication with nozzle capillaries, the method comprising the steps of:

a. providing a metal plate having opposing first and second surfaces and having a plurality of spaced-apart preliminary channels defined therethrough, each preliminary channel having a funnel-shape including a tapered end which opens at the first surface of the metal plate;

b. providing a resist layer on the first surface of the metal plate, which resist layer comprises a radiation-sensitive material;

c. subjecting first portions of the resist layer to high energy radiation by irradiating the second surface of the metal plate whereby radiation is directed through the preliminary channels of the metal plate onto the resist layer, the metal plate thereby functioning as a self-aligning mask;

d. providing negatives of a plurality of nozzle capillaries on the first surface of the metal plate by removing portions of the resist layer to expose portions of the first surface of the metal plate and filling at least the preliminary channels with a removable filler material,

e. electrodepositing a galvanic layer on the exposed portions of the first surface of the metal plate using the metal plate as an electrode, the galvanic layer thereby defining a plurality of nozzle capillaries;

f. planing the galvanic layer; and

g. removing the removable filler material and the negatives of the plurality of nozzle capillaries.

4,694,549

METHOD FOR REMOTELY REPLACING TUBE ENDS IN A HEAT EXCHANGER

George B. Rabe, Sparta, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Feb. 24, 1986, Ser. No. 831,889

Int. Cl.[4] **B21D** *53/00;* **F28F** *7/00;* **F16L** *55/18*

U.S. Cl. 29—157.3 C **10 Claims**

1. A method for remotely removing and replacing a tube end portion attached to a tubesheet of a heat exchanger, comprising:

(a) inserting a rotary cutting tool into a tube end portion and circumferentially severing the tube wall at a selected location near the tubesheet;

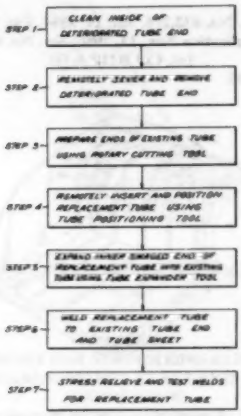
(b) removing a weld joint located between the tube end portion and the tube sheet;

(c) withdrawing the tube end portion out through the surrounding opening in the tubesheet;

(d) inserting a new replacement tube into the tubesheet

opening and axially positioning the new tube in axial alignment and interfitting engagement with the existing tube end;

(e) expanding the outer end of the new tube firmly into the surrounding tubesheet opening, so as to hold the new tube in position;


STEP 1
CLEAN INSIDE OF DETERIORATED TUBE END
STEP 2
REMOTELY SEVER AND REMOVE DETERIORATED TUBE END
STEP 3
PREPARE ENDS OF EXISTING TUBE USING ROTARY CUTTING TOOL
STEP 4
REMOTELY INSERT AND POSITION REPLACEMENT TUBE USING TUBE POSITIONING TOOL
STEP 5
EXPAND INNER SMALLER END OF REPLACEMENT TUBE INTO EXISTING TUBE USING TUBE EXPANDER TOOL
STEP 6
WELD REPLACEMENT TUBE TO EXISTING TUBE END AND TUBE SHEET
STEP 7
STRESS RELIEVE AND TEST WELDS FOR REPLACEMENT TUBE

(f) expanding the inner end of the replacement tube into the existing tube end;

(g) welding the new tube inner end to the existing tube end to provide a pressure-tight joint therebetween; and

(h) welding the new tube outer end to the tubesheet to provide a pressure-tight joint therebetween.

4,694,550

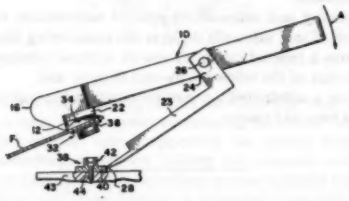
SNAP FASTENER TOOL

Jerry E. Grove, 3700 3-Mile Rd., Bay City, Mich. 48706

Filed Jun. 23, 1986, Ser. No. 877,170

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—267 **9 Claims**



1. A snap fastener tool for joining together a pair of mating fastener members secured respectively to a flexible cover and a fixed base, said tool comprising a handle having forward and rearward ends and being undercut at one end to form a shoulder facing the rearward end; a pad on said handle adjacent said shoulder which is adapted to overlie and bear on the fastener member secured to said cover; and a jack arm free at one end and pivoted at its other end to said handle between the ends of the latter for rocking movements of said one end toward and away from said handle, said jack arm being of such length that in one position thereof its one end confronts and is spaced rearwardly of said shoulder, said one end of said jack arm being adapted to seat against the fastener member secured to said base and said shoulder being adapted to seat against the fastener member secured to said cover with that portion of said handle rearward and adjacent said shoulder overlying the fastener member secured to said cover, whereby rocking movement of said handle about an arc having its center at said one end of said jack arm causes said fastener members to be drawn into overlying, axial alignment.

4,694,551

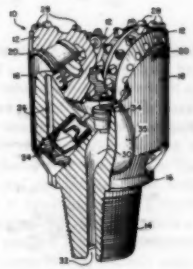
METHOD OF REMANUFACTURING A ROCK DRILL BIT

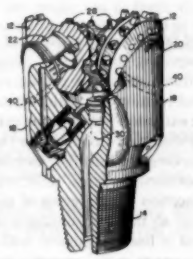
Will W. Mathews, Germantown, Tenn., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Dec. 30, 1985, Ser. No. 814,330

Int. Cl.[4] B23P *6/00*

U.S. Cl. 29—402.08 **15 Claims**





1. A method for remanufacturing a used rotary rock drill bit having a bit body with leg extensions supporting journals on which are rotatably mounted at least two cones including cutting elements, including the steps of:

(a) separating all the leg extensions, journals and cones simultaneously from the bit body along a line perpendicular to the central axis of rotation of the drill bit to form a substantially planar bit body attachment surface and discarding said leg extensions, journals and cones;

(b) forming at least two cone support assemblies, including leg extensions, journals and cones, from new materials;

(c) attaching the cutting element-containing cone assemblies to the bit body to form a remanufactured drill bit;

(d) removing the reusable cutting elements from the cones; and

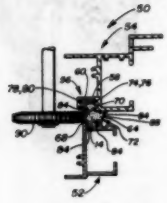
(e) attaching the reusable cutting elements recoverd in step (a) to the cones formed in step (b), adding new cutting elements as required to provide each cone with a full complement of cutting elements.

4,694,552

METHOD FOR FABRICATING A COMPOUND PORTAL FRAME EXTRUSION PROFILE

Warren S. Ecker, Delray Beach, Fla.; Howard J. Ecker, Hartsdale; Robert S. Ecker, New York, both of N.Y., and Maurice E. Sterner, Jr., Spring Grove, Pa., assignors to Ecker Mfg. Corp., New York, N.Y. and Product Design & Development, Inc., York, Pa.

Filed Aug. 28, 1986, Ser. No. 901,415
Int. Cl.[4] E04G 21/00; E04C 2/26
U.S. Cl. 29—418 6 Claims



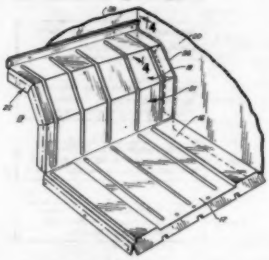
1. A method of fabricating a compound portal frame extrusion profile, comprising the steps of lineally aligning a first separate portal frame extrusion profile component in a detached and spaced relationship with respect to a second separate portal frame extrusion portal frame extrusion profile component, pivotally inserting a connection flange nose of a connection flange member of said first extrusion profile component within a connection flange nose receiving recess of a cooperative connection flange recess of said second extrusion profile component so that said connection flange member is pivotally received in lineal alignment within said cooperative connection flange recess in an insertable male-female mechanically cooperative positioning placement and thereby lineally positions a crimp lug protrusion of said first extrusion profile component adjacent a flex-extended crimp retention recess of said second extrusion profile component, accomplishing progressive lineal roll crimp conformed pivotal deflection engagement of said crimp retention recess from a flex-extended open position disposition to receivably engage said crimp lug protrusion in a closed crimp retention position to thereby effect an interim connecting means between said first and second extrusion profile components and form a lineally disposed intercommunicating U-shaped resin-receiving trough structure therebetween, injection depositing a resin-bonding insulating material within said lineally disposed intercommunicating U-shaped resin receiving trough structure from end-to-end longitudinally thereof, and thereafter cuttably removing a strip from a sidewall of said U-shaped resin-receiving trough down to the resin-bonding insulating contained therewithin to thereby provide a lineally extending thermal cavity barrier gap from end-to-end longitudinally of the compound portal frame extrusion profile thus formed.

4,694,553

METHOD OF MANUFACTURING REFRIGERATION APPARATUS CABINET CONSTRUCTION UTILIZING PREPAINTED STEEL PANELS

Ralph Tate, Jr., Center Township, Vanderburgh County, and John T. Woods, Scott Township, Vanderburgh County, both of Ind., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Division of Ser. No. 633,214, Jul. 19, 1984, Pat. No. 4,640,432.
This application Nov. 13, 1986, Ser. No. 931,391
Int. Cl.[4] B23P 9/00
U.S. Cl. 29—445 4 Claims



1. A method of assembling a plurality of sheet metal walls into an outer shell of a refrigeration apparatus cabinet to have a preselected width, comprising the steps of:

forming a U-shaped cabinet member having opposite, outwardly diverging planar sidewalls;

forming a deck member having a width greater than said preselected width;

forming obtusely angled flanges extending outwardly from opposite side edges of said deck member, said opposite side edges being spaced apart a distance less than said preselected width and said flanges having outer end portions spaced apart a distance greater than said preselected width;

wrapping said cabinet member about said deck member with said angled flanges extending into engagement with said sidewalls;

positioning said sidewalls in parallel relationship, whereby each of said sidewalls deflects the confronting flange and forms a tapered cavity therewith without substantial deflection of the sidewalls by-said flanges; and

flowing a substantially moisture-impermeable sealing material into said cavity.

4,694,554

METHOD OF CLAMPING OFF A TUBULAR MEMBER SUCH AS THE NECK OF A BALLOON

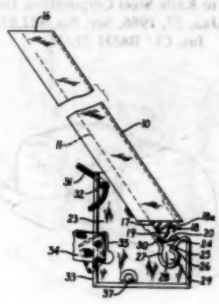
John E. McGrath, 17743 April Ct., Castro Valley, Calif. 94546

Division of Ser. No. 799,127, Nov. 18, 1985, Pat. No. 4,648,178.
This application Oct. 14, 1986, Ser. No. 918,544
Int. Cl.[4] B23P 11/02
U.S. Cl. 29—450 1 Claim

1. A method for clamping off a tubular member such as the neck of a balloon with a clip having clamping arms joined by a hinge, with a device comprising a base member having a surface for receiving a clip, means forming a notch in said surface and a stop on one side of said notch, comprising the steps of:

placing a clip on said surface with one arm thereof resting against said stop and the hinge overlying said notch, inserting the neck of a tubular member into the hinge por-

tion of said clip and pulling said neck and clip down through said notch to urge the clamping arms of the clip



into a locked position, thereby clamping off said tubular member.

4,694,555

ASSEMBLIES FOR SUPPORTING ELECTRICAL CIRCUIT BOARDS WITHIN TUBES AND METHOD OF USING SAME

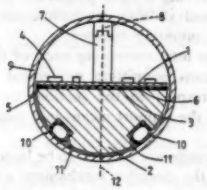
Michael K. Russell, Prestbury; Donald L. Wesenberg, Northleach, and Peter A. Leaney, Cheltenham, all of England, assignors to NL Industries, Inc., New York, N.Y.

Filed Apr. 21, 1986, Ser. No. 854,367

Claims priority, application United Kingdom, Feb. 7, 1986, 8603122

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—451 **9 Claims**



1. An assembly for supporting an electrical circuit board within a tube, the assembly comprising the circuit board, an elongated support spine supporting the circuit board, and shock-absorbing means for holding the assembly within the tube, wherein the shock-absorbing means includes longitudinally along said spine exterior at least one elongated tubular member the outside diameter of which can be changed, by varying the internal pressure of the tubular member, between a relatively contracted state in which the assembly can be inserted into the tube from one end and a relatively expanded state in which the assembly is subsequently held firmly within the tube.

9. A method of inserting an electrical circuit board support assembly into a tube, wherein the assembly comprises an elongated circuit board and a support spine supporting the circuit board, which method comprises providing shock-absorbing means in a position on the spine to engage the inside wall of the tube, the shock-absorbing means includes longitudinally along said spine exterior at least one elongated tubular member the outside diameter of which can be changed by varying the internal pressure of the tubular member, inserting the assembly into the tube with the or each tubular member in a relatively contracted state corresponding to a first internal pressure, and holding the assembly firmly within the tube with the or each tubular member in a relatively expanded state corresponding to a second internal pressure.

4,694,556

TRACK TREAD

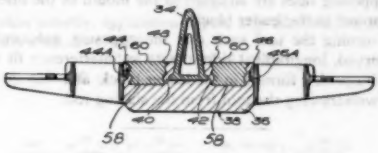
Paul Hewitt, Hexham, England, assignor to George Blair P.L.C., Forth, Great Britain

Continuation of Ser. No. 461,206, Nov. 1, 1982, abandoned. This application Dec. 17, 1985, Ser. No. 811,311

Claims priority, application United Kingdom, Oct. 31, 1981, 8132904

Int. Cl.[4] B23P *11/02*

U.S. Cl. 29—451 **3 Claims**



1. A method of applying a wear surface pad to a link body of an endless track of a tracked vehicle, said link body having at least one aperture where the aperture wall is provided with a circumferential locking rib defining a neck in the aperture which is smaller in diameter than the remainder of the aperture and is intermediate the ends thereof, the wear surface pad being of resilient plastic and which has at least one projection integral with the pad and of the same resilient plastic, said projection having a circumferential groove to receive said circumferential locking rib, the projection comprising a wall defining a hollow interior to allow deforming of the projection, said method comprising resiliently deforming the projection and passing it so deformed into the aperture to engage said locking rib with said circumferential groove, releasing the deforming force on the projection, inserting a plug into the hollow interior of the projection to force the projection wall against the aperture wall and lock the pad to the link body, the plug being of a size and shape corresponding to the hollow interior of the projection.

4,694,557

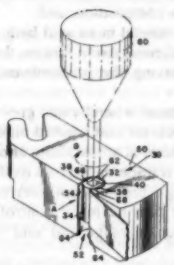
LEADER TAPE STAKING ROD AND RELATED METHOD OF ASSEMBLY

Anthony L. Gelardi, Cape Porpoise, Me., assignor to Shape Inc., Biddeford, Me.

Filed Mar. 25, 1986, Ser. No. 843,688

Int. Cl.[4] B23P *19/02*; G11B *23/107*

U.S. Cl. 29—525 **8 Claims**



1. A method for forming a leader block assembly for a tape cartridge, comprising the steps of:

(a) forming a leader block having a sustantially cylindrical shaped opening with a mouth;

(b) forming a staking rod including an elongated member

having a substantially cylindrical shape with first and second ends, two opposing, substantialy curved, longitudinal sides, two opposing, substantially flat, longitudinal sides and an opening having a first configuration in the first end;

(c) positioning a leader tape in the opening formed in the leader block;

(d) inserting a tool having a tip with the first configuration into the corresponding opening formed in the staking rod;

(e) transferring the staking rod via the tool to the vicinity of the opening formed in the leader block;

(f) inserting the staking rod via the tool into the opening formed in the leader block, such that the substantially flat, opposing sides are adjacent to the mouth of the opening formed in the leader block;

(g) turning the tool such that the opposing, substantially curved, longitudinal sides create an interference fit with the opening formed in the leader block; and

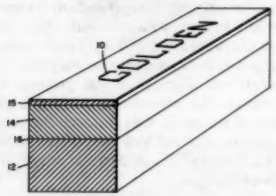
(h) withdrawing the tool from the staking rod.

4,694,558

BIMETAL THERMOSTATS AND METHOD OF MANUFACTURE

Ron J. DeNuccio, Greensboro, N.C.; Han J. Kim, Concord, Mass., and Chi H. Leung, Greensboro, N.C., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jan. 6, 1986, Ser. No. 816,496
Int. Cl.[4] B23P *17/00*; C23C *16/40*
U.S. Cl. 29—527.2 **9 Claims**



1. In a process for manufacturing golden-hued indicia bearing thermostatic bimetals having two sections of metal joined to each other and adapted to move in response to changes in temperature, said bimetals having a section of low thermal expansion and another of high thermal expansion, at least one of said sections having a predominantly ferrous composition and having an oxide film disposed thereon, the steps which comprise:

forming a bimetal with at least one section having a predominantly ferrous composition; and

immersing said bimetal in an acid bath; and

forming a grey ferrous oxide film on the external surface of the section having the predominantly ferrous composition; and

washing said bimetal whereby said grey film is removed, and marking an indicia on said washed bimetal; and

heating said bimetal in an oxidizing atmosphere to temper it and to form a transparent ferrous oxide film on at least said section having a predominantly ferrous composition, said ferrous oxide film having a controlled thickness in the interferance color range and said indicia being visible thereon.

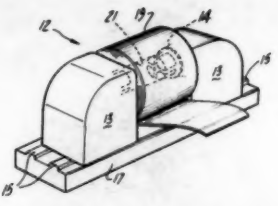
7. A bimetal having at least one section formed of a ferrous metal, said bimetal having a thin ferrous oxide film on the surface of the section formed of the ferrous metal, said thin ferrous oxide coating having a thickness between about 440 and 480 Angstroms such that it has a golden hue, said bimetal further having indicia marked on said section having a thin ferrous oxide film.

4,694,559

EXPANDING ARBOR

Allen W. Lundy, Highland, and Leonard Kasle, Franklin, both of Mich., assignors to Kasle Steel Corporation, Dearborn, Mich.

Filed Jan. 27, 1986, Ser. No. 822,818
Int. Cl.[4] B65H *75/24*
U.S. Cl. 29—559 **13 Claims**



1. An expandable arbor adapted for mounting to a standard decoiler mechanism and movable by the decoiler mechanism into the axial bore of a coil of material to rotatably support the coil and allow material to be unwound therefrom, the decoiler mechanism having a coil support means attached thereto with the support means having a forward end, a rearward end and a body which increases in diameter in the direction from the forward end to the rearward end, said expandable arbor comprising:

a mounting member adapted to be mounted to the forward end of the coil support means, the mounting member having at least two circumferentially spaced first guides about the perimeter thereof;

at least two opposed sections, each of the sections having an elongated, transversely curved outer surface with the surfaces being longitudinally positionable within the bore, the sections having second guides substantially complementary to and slidably interconnected with the first guides of the mounting member;

expansion means interconnecting each of the sections, the expansion means permitting movement of the support means with respect to the sections converting lateral movement of the support means into radial expansion of the sections;

whereby the sections are adapted to be laterally moved into the bore by the decoiler mechanism with the sections thereafter expanding radially outwardly into engagement with the bore.

4,694,560

APPARATUS FOR TREATING STATOR WINDING LEADS

Giorgio Barrera, Leumann, Italy, assignor to Officine Meccaniche Pavesi & C. S.p.A., Turin, Italy

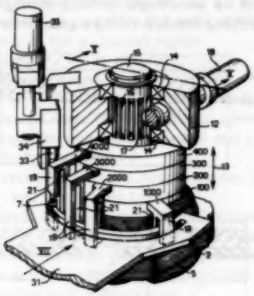
Filed May 14, 1986, Ser. No. 863,216
Claims priority, application Italy, Jul. 23, 1985, 67674 A/84
Int. Cl.[4] H02K *15/00*
U.S. Cl. 29—564.1 **9 Claims**

1. A device usable in the manufacture of stators for dynamoelectric machines for fixing end portions of the stator coils to a support member carried by the stator, wherein the device includes:

means for disposing the end portions of the stator coils in directions parallel to a plane substantially perpendicular to the axis of the stator and facing an end surface of the stator so as to make the end portions project outwardly from the stator,

means for moving the end portions in the said plane substantially perpendicular to the axis of the stator until they are

brought into a zone of the end surface of the stator in which the support member is disposed, and



means for thrusting the end portions into corresponding grooves provided in the support member.

4,694,561

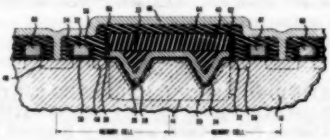
METHOD OF MAKING HIGH-PERFORMANCE TRENCH CAPACITORS FOR DRAM CELLS

Joseph Lebowitz, Watchung; William T. Lynch, Summit, both of N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 30, 1984, Ser. No. 676,677

Int. Cl.[4] H01L *21/72, 21/385*

U.S. Cl. 437—52 **1 Claim**



1. A method of making a VLSI DRAM device in a semiconductive member, said method comprising the steps of

forming trenches in a portion of said member that exhibits a specified conductivity type, said trenches each including walls that extend into the member from a main planar surface thereof, whereby edges are defined where the trench walls meet the main planar surface,

masking the entire main planar surface of said member except for limited surface portions that extend a prescribed distance away from said edges,

simultaneously introducing dopants of the opposite conductivity type into shallow regions below said surface portions and below said trench wall to form in and adjacent to each trench in said semiconductor member a continuous conductive layer that comprises a conductive trench layer and a conductive laterally extending surface extension thereof,

and forming an associated MOS transistor, including source and drain regions, in said same semiconductive member adjacent each trench to establish one region of each such adjacent transistor in electrical contact with a portion of the laterally extending extension of the adjacent trench layer,

wherein said masking step comprises

forming a relatively thick layer on the entire main planar surface of said member and a relatively thin layer on the walls of said trenches,

and then etching said layers to remove said relatively thin layer from the walls of said trenches and to pattern said relatively thick layer to form a relatively thin masking layer that covers the entire main planar surface of said member except for said limited surface portions.

4,694,562

METHOD FOR MANUFACTURING A SEMICONDUCTOR INTEGRATED DEVICE INCLUDING BIPOLAR AND CMOS TRANSISTORS

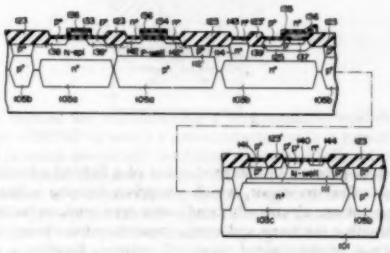
Hiroshi Iwasaki, Chigasaki, and Shintaro Ito, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 847,150, Apr. 3, 1986, Pat. No. 4,637,125, which is a continuation of Ser. No. 652,087, Sep. 19, 1984, abandoned. This application Oct. 31, 1986, Ser. No. 925,266

Claims priority, application Japan, Sep. 22, 1983, 58-175363; Sep. 28, 1983, 58-179558

Int. Cl.[4] H01L *21/38*

U.S. Cl. 437—57 **2 Claims**



1. A method for manufacturing a semiconductor integrated device comprising the steps of:

selectively doping an impurity of a second conductivity type on a main surface of a semiconductor substrate of a first conductivity type to form a first high concentration buried region of the second conductivity type for bipolar transistors and a second high concentration buried region of the second conductivity type for a MOS transistor;

selectively doping an impurity of the first conductivity type in said semiconductor substrate to form a third high concentration buried region of the first conductivity type surrounding said first high concentration buried region for the bipolar transistors and a fourth high concentration buried region of the first conductivity type for the MOS transistor;

epitaxially growing a semiconductor layer of the second conductivity type on a surface of said semiconductor substrate in which high concentration buried regions are formed;

selectively diffusing an impurity of the first conductivity type from a main surface of said semiconductor layer to form a well region of the first conductivity type reaching said fourth high concentration buried region;

selectively performing high-concentration diffusion of an impurity of the first conductivity type in the main surface of said semiconductor layer, or selectively converting said semiconductor layer into an insulating layer, to form an electrical isolation region reaching said third high concentration buried region formed to surround said first high concentration buried region; and

forming a vertical bipolar transistor and MOS transistors of a first and second conductivity type channel, said bipolar transistor being formed in the semiconductor region of the second conductivity type surrounded by said electrical isolation region, which includes said semiconductor region as the collector region, the MOS transistor of the second conductivity type channel being formed in said well region of the first conductivity type, and the MOS transistor of the first conductivity type channel being

formed on the semiconductor region of the second conductivity type positioned above said second high concentration buried region.

4,694,563

PROCESS FOR MAKING SCHOTTKY-BARRIER GATE FET

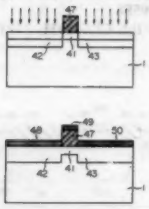
Kenichi Kikuchi, Osaka, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 26, 1982, Ser. No. 342,912

Claims priority, application Japan, Jan. 29, 1981, 56-11812; Apr. 24, 1981, 56-62999

Int. Cl.⁴ H01L *21/265*

U.S. Cl. 437—40 **9 Claims**



1. A process for the production of a Schottky-barrier gate field effect transistor, which comprises forming a first active layer of one electrically conductive type semiconductor crystal with a thickness and carrier concentration chosen so as to give a predetermined pinch-off voltage, forming a pattern thereon, introducing an impurity for giving the same electrically conductive type as the first active layer into the first active layer by ion implantation or thermal diffusion selectively through the pattern as a mask to form a second deeper active layer at both sides of the first active layer such that the second active layer has a surface carrier concentration substantially equal to that of the first active layer, and then forming electrodes.

4,694,564

METHOD FOR THE MANUFACTURE OF A SCHOTTKY GATE FIELD EFFECT TRANSISTOR

Takatomo Enoki, Soubudai-Ryo, 2-183, Soubudai, Zama-shi, Kanagawa 228; Kimiyoshi Yamasaki, Denden 5-101, 861-1, Ishida, Isehara-shi, Kanagawa 259-11, and Kuniki Ohwada, 1074-47, Katakura-cho, Hachioji-shi, Tokyo 192, all of Japan

Filed Jul. 21, 1986, Ser. No. 887,211

Claims priority, application Japan, Jul. 29, 1985, 60-167304

Int. Cl.⁴ H01L *21/467*

U.S. Cl. 437—40 **6 Claims**

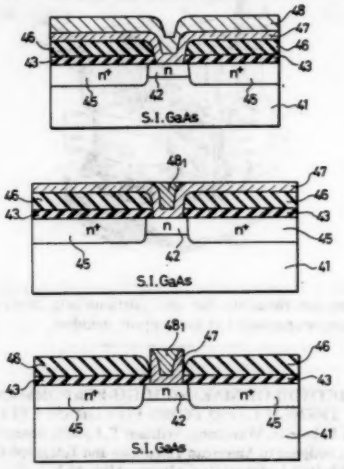
1. A method for the manufacture of a field effect transistor, comprising:

a step wherein a source region, a drain region, and an active region sandwiched therebetween are formed in the body of a semiconductor substrate near its one main surface and an insulating film of at least one layer deposited all over the main surface of the substrate is selectively removed, exposing a part of the active region formed in the semiconductor substrate;

a step wherein an underlying metal which forms a Schottky junction between it and the semiconductor of the active region and can be removed by anisotropic etching and an overlying metal of at least one layer which is capable of serving as a mask for the etching of the underlying metal are deposited in layers on the insulating film and the substrate surface exposed through the aperture made in the insulating film, filling the aperture with the underlying and the overlying metal;

as step wherein the surface of the overlying metal layer is planarized so that the overlying metal layer selectively remains in the aperture of the insulating film;

a step wherein the underlying metal layer is selectively removed by anisotropic etching through the remaining the overlying metal, forming a gate electrode of the overlying and underlying metal layers on the active region exposed through the aperture of the insulating film; and



a step wherein the insulating film is partly removed and source and drain electrodes are formed on the source drain regions, respectively.

4,694,565

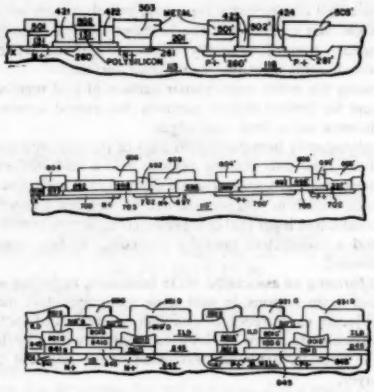
METHOD OF MAKING HARDENED CMOS SUB-MICRON FIELD EFFECT TRANSISTORS

Frank Z. Custode, Norco, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 28, 1986, Ser. No. 856,304

Int. Cl.⁴ H01L *21/385, 21/425*

U.S. Cl. 437—34 **8 Claims**



1. A process for providing CMOS sub-micron n-channel and p-channel devices on a p-doped silicon wafer, comprising the steps of:

growing a layer of oxide on the wafer;

applying a layer of photoresist over the oxide;

using a well mask to open a region for the p-channel device to bare silicon;
implanting phosphorus ions in the p-channel region to initiate the formation of n-doped well;
driving in the ions to complete the well, while growing a layer of oxide in the p-channel region;
stripping the oxide;
growing gate oxide;
applying a layer of photoresist over the wafer;
using a source and drain contact mask to open source and drain openings through the photoresist and oxide to bare silicon for both channels;
depositing a layer of polysilicon over the wafer including the bare silicon and the opened oxide;
depositing a layer of nitride over the polysilicon;
depositing a layer of low temperature oxide over the nitride;
depositing photoresist over the low temperature oxide;
using a double active region mask to protect the channel and open field oxide regions elsewhere;
etching the photoresist, low temperature oxide, nitride, and a portion of the polysilicon outside the active regions;
depositing photoresist;
using an active region mask to protect the p-channel region with a layer of photoresist;
field implanting boron ions into the field oxide region around the n-channel region while protecting the p-channel region from the implant;
stripping the photoresist layer, low temperature oxide and growing field oxide using the nitride as masks for the active regions;
depositing photoresist;
using a p-channel region source and drain mask to open source and drain regions in the p-channel region;
implanting boron ions into said source and drain regions to dope them P+;
implanting a low dose of boron ions into the n and p channels to adjust threshold voltages;
using an opaque source and drain mask and photoresist to cover the source and drain regions for the p-channel;
implanting phosphorus ions into the polysilicon layer;
stripping the photoresist;
activating all implants including:
boron implant of the source and drain for the p-channel,
the low dose boron for both channels for threshold adjustment, and
the phosphorus implant into polysilicon;
applying photoresist;
using gate-contact mask to delineate gaps in the nitride adjacent both sides of channel electrode regions being formed; and etch away the delineated nitride and part of the polysilicon;
applying photoresist over the n and p-channels and opening the p-channel regions;
implanting the source and drain of the p-channel region to extend the P+ source and drains of the p-channel by boron ion implant;
stripping the photoresist;
applying photoresist and opening the n-channel regions;
implanting phosphorus ions to extend the N+ source and drain regions;
stripping the photoresist;
growing cross-over oxide in the gap regions, and activating all implants not previously activated;
etching away the nitride layer;
depositing metal;
applying a layer of photoresist over the metal and using a metal mask to etch the photoresist and metal except for the interconnects to the source for each n and p channel, gate for each n and p channel and drain for each n and p channel;
stripping the photoresist; and,
sintering the structure as now completed.

4,694,566

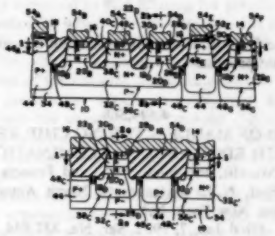
METHOD FOR MANUFACTURING PROGRAMMABLE READ-ONLY MEMORY CONTAINING CELLS FORMED WITH OPPOSING DIODES

George W. Conner, Ben Lomond; Raymond G. Donald, San Jose, and Ronald L. Cline, Los Gatos, all of Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 367,492, Apr. 12, 1982, abandoned. This application Jul. 19, 1985, Ser. No. 757,185

Int. Cl.[4] H01L *21/265, 29/72, 21/225*

U.S. Cl. 437—48 **14 Claims**



1. A method for manufacturing a programmable read-only memory (PROM) in which a semiconductor body is provided with a recessed electrically insulating region that fully adjoins the entire lateral boundary of each of at least two monocrystalline portions of a doped semiconducting region of a first conductivity type spaced laterally apart from one another along a top surface of the doped semiconducting region, a semiconductor dopant of a second conductivity type opposite to the first conductivity type is introduced through the top surface into part of each monocrystalline portion to define therein a substantially horizontal first PN junction that fully adjoins the insulating region and to leave therein a lower region of the first conductivity type, and a substantially horizontal second PN junction that fully adjoins the insulating region is defined in each monocrystalline portion above its first PN junction, characterized in that the step of introducing comprises ion implanting the dopant into the monocrystalline portions with energy sufficient to cause the maximum concentration of the dopant to occur below the second PN junctions at a vertical distance from the mid-point between the pair of first and second PN junctions in each monocrystalline portion that is no more than 20 percent of the distance between that pair of PN junctions.

4,694,567

METHOD FOR MAKING A SUPERCONDUCTING GRADIOMETER HAVING A THREE-DIMENSIONAL STRUCTURE AND ASSOCIATED CONNECTING LINES FOR A DEVICE FOR MEASURING WEAK MAGNETIC FIELDS

Gabriel M. Daalmans, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Nov. 6, 1985, Ser. No. 795,370

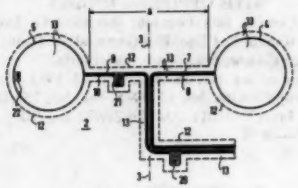
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1984, 3442269

Int. Cl.[4] H01L *39/24*

U.S. Cl. 29—599 **18 Claims**

1. A method for manufacturing a gradiometer having a three-dimensional structure for a device for the single-or multichannel measurement of magnetic fields with field intensities down to less than 10^{-10}T and in particular, below 10^{-12}T, wherein at least one superconducting gradiometer coil of predetermined dimensions is arranged a support body and connected by means of superconducting connecting lines and a coupling coil to a superconducting quantum interference element (SQUID) in a magnetically coupling manner, wherein the gradiometer coil and at least the connecting lines associated with the coil are applied as thick or thin films together and

simultaneously to a common three-dimensional support body in which at least one coating operation is preceded for the



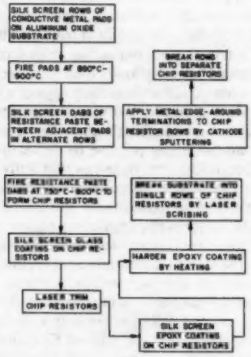
position-wise fixation of the corresponding conductor runs by a lithographic process.

4,694,568

METHOD OF MANUFACTURING CHIP RESISTORS WITH EDGE AROUND TERMINATIONS

Amedeo J. Morelli, Randolph, N.J., and Francis L. Gaylord, Painted Post, N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Jan. 7, 1982, Ser. No. 337,644
Int. Cl.[4] H01C *17/06*
U.S. Cl. 29—620 **14 Claims**


SILK SCREEN ROWS OF CONDUCTIVE METAL PADS ON ALUMINUM OXIDE SUBSTRATE
FIRE PADS AT 850°C-900°C
SILK SCREEN DABS OF RESISTANCE PASTE BETWEEN ADJACENT PADS IN ALTERNATE ROWS
FIRE RESISTANCE PASTE DABS AT 750°C-800°C TO FORM CHIP RESISTORS
SILK SCREEN GLASS COATING ON CHIP RESISTORS
LASER TRIM CHIP RESISTORS
SILK SCREEN EPOXY COATING ON CHIP RESISTORS
HARDEN EPOXY COATING BY HEATING
BREAK SUBSTRATE INTO SINGLE ROWS OF CHIP RESISTORS BY LASER SCRIBING
APPLY METAL EDGE-AROUND TERMINATIONS TO CHIP RESISTOR ROWS BY CATHODE SPUTTERING
BREAK ROWS INTO SEPARATE CHIP RESISTORS

1. A method of manufacturing chip resistors comprising:

(a) depositing an even series of electrically separated, essentially parallel rows of electrically conductive metal pads on a major surface of a thin electrically insulating ceramic substrate, each of said metal pads facing an opposing pad in an opposing row of other said pads, one row of said metal pads being adjacent to a first edge of said substrate and a second row of said metal pads being adjacent to a second edge of said substrate essentially parallel to said first edge,

(b) firing said metal pads at a temperature sufficient to fix said metal pads to said substrate,

(c) depositing resistor paste dabs extending between, and in electrical contact with, opposing metal pads in opposing rows of said metal pads, and in a manner such that each of said metal pads is electrically connected with only one other of said metal pads thereby forming at least one row of at least two electrically separated resistors on said surface of said substrate,

(d) firing said resistor paste dabs at a temperature sufficient to fix said resistor paste dabs to said substrate,

(e) trimming each of said resultant resistors to a desired value,

(f) scribing fragmentation lines in said surface of said substrate between each of said resistors,

(g) breaking said substrate along fragmentation lines separating the rows of resistors into strips each strip containing a single row of resistors,

(h) depositing by vapor deposition, narrow electrically conductive metal bands over each of said rows of metal pads adjacent to an edge of said substrate, and extending over said adjacent edge thereby forming edge-around terminations on said resistors and

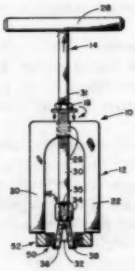
(i) separating said resistors, one from another, along said fragmentation lines.

4,694,569

BEARING EXTRACTOR

William F. Colvell, 4375 Weber River Dr., and Dean M. Baker, 548 W. 4900 S., both of Ogden, Utah 84405

Filed Apr. 2, 1986, Ser. No. 847,354
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—724 **2 Claims**



1. A bearing extractor, comprising:

U-shaped support having a flat top portion and a pair of legs capable of impacting a case surrounding a bearing to be extracted;

a bearing grasping assembly, said assembly including a nut-shaped support having internal threads and a pair of expandable prongs extending from said nut-shaped support, each of said prongs having internal threads and a ledge formed at the bottom thereof for engaging the bottom of said bearing;

a rod, said rod being slidable and rotatable within said top portion of said U-shaped support and rotatable within said bearing grasping assembly, said rod having threads for engaging said threads of said nut-shaped support and said prongs, and said prongs having a preselected internal configuration for engaging an end of said rod in order to expand said prongs against the interior surface of said bearing when said rod is rotated into said nut-shaped support, and said rod having a handle at another end thereof; and

means for encompassing said rod for adjustably supporting said rod with respect to said U-shaped support;

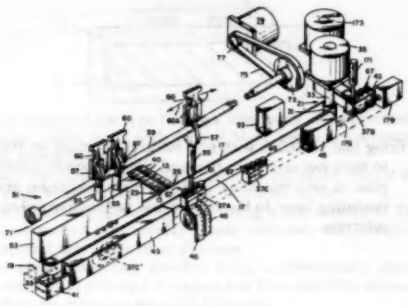
whereby after said prongs of said bearing grasping assembly are expanded against the interior surface of said bearing, outward movement of said rod draws said bearing case into contact with said legs of said U-shaped support, and further outward movement of said rod removes said bearing from said bearing case.

4,694,570

SURFACE MOUNTED COMPONENT TRANSPORT MECHANISM

John M. Rudolph, Carlsbad, and George M. Wohlhieter, Santa Maria, both of Calif., assignors to AMISTAR Corporation, Torrance, Calif.

Filed Nov. 21, 1985, Ser. No. 800,217
Int. Cl.[4] H05K *3/30*
U.S. Cl. 29—740 **9 Claims**



1. A random access surface mounted component transport system used in the population of surface mounted components (SMC) in printed circuit board (PCB) fabrication, including:

an elongated movement mechanism including a multiple SMC carrier, said mechanism having a plurality of adjacent loading points and a downstream off-loading station, said movement mechanism including an overhead cam assembly including a bus-carried SMC-holding mechanism actuator, a different one of said actuators being disposed at each of said loading points;

a plurality of adjacent SMC carrier media disposed adjacent said movement mechanism, each SMC carrier media associated with a different one of said loading points;

loading means positioned adjacent said loading points and said SMC carrier media for moving selected SMC from said carrier media to said multiple SMC carrier of said movement mechanism for transportation of SMC to said off-loading station;

unloading means position adjacent said off-loading station for moving SMC from said multiple SMC carrier to an appropriate position on a PCB in a predetermined sequence; and

bus means for transporting said SMC, said bus means including a plurality of bus members temporarily attachable to said time belt upstream of said loading points and temporarily detachable from said time belt adjacent said off-loading station.

4,694,571

APPARATUS FOR AUTOMATICALLY CHANGING X-RAY FILMS

Hideo Kanai, Gunma; Toshinori Komba, Tokyo, and Eiji Mogi, Kanagawa, all of Japan, assignors to Nagase Medical Supply Co., Ltd., Osaka, Japan

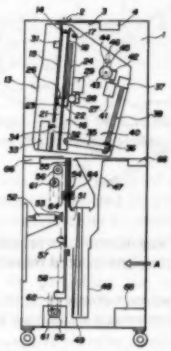
Filed Mar. 31, 1986, Ser. No. 846,049
Claims priority, application Japan, Apr. 2, 1985, 60-49080[U]
Int. Cl.[4] B23P *19/00, 21/00*
U.S. Cl. 29—806 **4 Claims**

1. An apparatus for changing X-ray films of cassettes each of which has two halves hinged together at respective ends thereof, each of the cassettes being open after one of the two halves is moved away from the other of the two halves about the hinged respective ends thereof, each of the cassettes being closed to contain an X-ray film therein when said one of the two halves covers the other of said two halves, and each of the cassettes having securing means for securing an X-ray film therein when the cassette is in a state that is not completely closed, said apparatus comprising:

a housing having a slot extending therethrough at the top thereof through which one of the cassettes is inserted when changing an X-ray film contained therein, and a shutter mounted within the housing adjacent said slot, the shutter being movable relative to said housing for opening and closing said slot;

a cassette supporting means within said housing for supporting the cassette in a vertical orientation with said hinged ends thereof up after the cassette is inserted through said slot into said housing, said cassette supporting means pivotally mounted to said housing for pivoting between a first position at which the cassette remains disposed in a generally vertical orientation and at which an exposed X-ray film within the cassette is discharged therefrom by falling out of the cassette when the cassette is open and a second position at which an unexposed X-ray film is loaded into the cassette, said cassette supporting means having a cassette opening and closing means for engaging both of said halves of said cassette to open and close the cassette;

an exposed film chamber within said housing and below said cassette supporting means for containing exposed X-ray films that have respectively fallen from ones of the cassettes;



a film chute within said housing between said cassette supporting means and said exposed film chamber for guiding an exposed X-ray film falling from the open cassette supported by said cassette supporting means at said first position to the exposed film chamber;

an unexposed film chamber within said housing and below said cassette supporting means for containing unexposed X-ray films to be fed to the cassette supported by said cassette supporting mans at said second position;

vertical guide rail means movably mounted within said housing and extending between said unexposed film chamber and said cassette supporting means, and transporting means for moving said guide rail means between a first position adjacent said unexposed film chamber and a second position at which the guide rail means extends into the open cassette supported by said cassette supporting means at said second position thereof;

film transporting means within said housing having a suction pad for transferring an unexposed X-ray film from said unexposed film chamber to said guide rail means when said guide rail means is at said first position thereof;

a lifter movably mounted within said housing for raising an unexposed X-ray film along and relative to said guide rail means until an upper portion of the unexposed X-ray film extends beyond the top of the guide rail means; and

control means for controlling said cassette supporting means to pivot to said first position thereof after a cassette is

supported thereby and for causing said cassette opening and closing means to open said cassette so that an unexposed X-ray film contained therein falls into said film chute and is guided thereby into said exposed film chamber, for subsequently controlling the cassette supporting means to pivot to said second position, for controlling the film transporting means to transfer an unexposed X-ray film from said unexposed film chamber to said guide rail means, for subsequently controlling said transporting means to raise said guide rail means to said second position thereof to move the guide rail means into the cassette, for controlling said lifter to move an unexposed X-ray film into said cassette, for controlling said cassette opening and closing means to close the cassette thereby securing the unexposed X-ray film to and within the cassette with the securing means as the cassette is closed, and for controlling said transporting means to lower the guide rail means after said unexposec X-ray film is secured to the cassette before the cassette is completely closed.

4,694,572

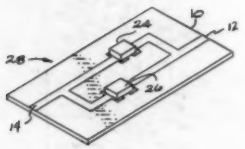
PRINTED POLYMER CIRCUIT BOARD METHOD

David C. Leber, and Timothy L. Falk, both of Vancouver, Wash., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 13, 1986, Ser. No. 874,265

Int. Cl.[4] H05K *3/34*

U.S. Cl. 29—840 **3 Claims**



1. A method of manufacturing a printed circuit board having electrical circuit elements secured thereto comprising the steps of:

(a) forming a polymer component, at least a portion of said component comprising a substrate for a printed electrical circuit;

(b) forming electrical circuit runs and electrical contact pads on said substrate with an electrically conductive, adhesive ink;

(c) mounting said electrical circuit elements to said electrical contact pads; and

(d) curing said electrically conductive, adhesive ink with said electrical circuit elements secured thereto.

4,694,573

METHOD OF FORMING ELECTRICALLY CONDUCTIVE CIRCUIT

Atsushi Nishino, Neyagawa; Masaki Ikeda, Hirakata; Yoshihiro Watanabe, Moriguchi, and Masahiro Hiraka, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP85/00327, § 371 Date Feb. 10, 1986, § 102(e) Date Feb. 10, 1986, PCT Pub. No. WO86/00190, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 12, 1985, Ser. No. 832,716

Claims priority, application Japan, Jun. 14, 1984, 59-120648

Int. Cl.[4] H05K *3/20*

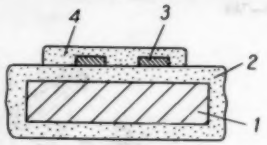
U.S. Cl. 29—846 **10 Claims**

1. A method of forming an electrically conductive circuit comprising the steps of:

preparing a transferring paper in which an assembly of electrically conductive foil carrying a predetermined pattern and an insulating layer containing glass frit and an overcoat layer consisting of a resin film having good burning property are provided on a transferring mount paper covered with soluble paste layer;

removing an integral structure of said assembly of said conductive foil, said insulating layer, and said overcoat layer from said transferring paper;

setting the removed integral structure onto a substrate;



firing said substrate with said integral structure set thereon to burn out said resin film and simultaneously soften the glass in said insulating layer, to form a vitreous enamel insulating layer to thereby fix said conductive foil to said substrate.

4,694,574

PIPE SCRAPER

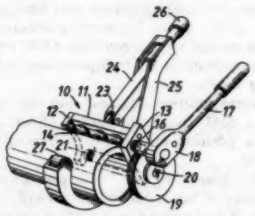
Alan J. Dickinson, Cramlington, England, assignor to British Gas Corporation, England

Filed Jun. 5, 1985, Ser. No. 741,530

Claims priority, application United Kingdom, Jun. 7, 1984, 8414545

Int. Cl.[4] B23D *21/06*

U.S. Cl. 30—94 **6 Claims**



1. A scraper comprising:

a helically bladed rotary scraping member, and means for applying said scraping member to a cylindrical surface of an object while rotating past said surface such that said scraping member forms a low angle helix scrape which approximates a longitudinal scrape on said surface, said means comprising:

a support structure,

operating means,

drive means,

and step down gearing,

said scraping member and said drive means being mounted on said structure,

said operating means being operatively connected to said scraping member to rotate the same,

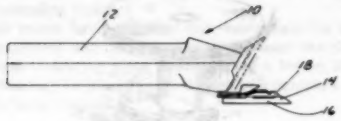
and also being operatively connected by said gearing to said drive means to rotate the same in rolling drive engagement with said object, thus relatively to rotate said structure and said object.

4,694,575

CLIPPER ATTACHMENT DEVICE

Daniel A. Boerger, 5132 Norman St., Racine, Wis. 53406

Filed Aug. 25, 1986, Ser. No. 900,009
Int. Cl.[4] B26B *19/04*
U.S. Cl. 30—221 **14 Claims**



1. A clipper of the type having a main body and a pivotably-mounted cutter head with a fixed blade and a reciprocating blade, comprising:

male and female connecting members including one on the main body and the other on the cutter head;

the female connecting member being a slot formed of first and second substantially planar principal wall members spaced apart by a fixed distance;

the male connecting member being a substantially planar member of principal thickness less than said fixed distance for easy insertion into said slot; and

one of the substantially planar members having a resilient portion offset from the plane thereof by a distance greater than the fixed distance less the principal thickness, and biased therefrom in a direction normal to said plane,

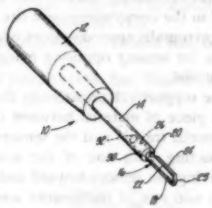
whereby looseness between said planar members is eliminated.

4,694,576

TOOL FOR REMOVING WINDSHIELD SEALANT

Jeffrey R. Cothery, Livonia, Mich., assignor to Reid Manufacturing Co., Inc., Southfield, Mich.

Continuation of Ser. No. 799,560, Nov. 20, 1985, abandoned, which is a continuation of Ser. No. 630,949, Jul. 16, 1984, abandoned. This application Aug. 14, 1986, Ser. No. 898,721
Int. Cl.[4] B26B *3/00*
U.S. Cl. 30—280 **6 Claims**



1. A tool for forming a groove of fixed width in a urethane sealant disposed about the periphery of an automobile windshield, the groove so formed being dimensioned to receive a windshield-retaining molding thereon, said tool comprising:

an elongated member defining a longitudinal axis of said tool, said member comprising a first end portion, and a secone end portion opposite said first end portion;

a handle affixed to said first end portion of said elongated member; and

a blade comprising a mounting sleeve and a cutting member affixed to said mounting sleeve;

wherein said second end portion of said elongated member defines a longitudinal bore extending partway through said elongated member, said bore being closely dimensioned to said mounting sleeve so that said second end portion detachably frictionally engages said sleeve when said mounting sleeve is inserted in said bore;

wherein said cutting member is substantially U-shaped in cross section transverse to said longitudinal axis of said tool defined by said elongated member; and

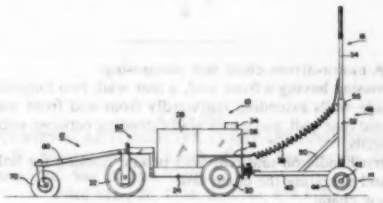
wherein said cutting member comprises a pair of longitudinally extending, radially opposed edges, and a pair of laterally extending, radially opposed second edges disposed perpendicularly to said longitudinally extending edges, opposite said mounting sleeve.

4,694,577

SELF-PROPELLED, SELF-STEERED VEHICLE FOR POWER DRIVEN PLANT TRIMMING TOOLS

Jacobus C. van der Merwe, and Lucas C. van der Merwe, both of 801 Beechwood Dr., Kingsport, Tenn. 37663

Filed Jul. 18, 1986, Ser. No. 886,801
Int. Cl.[4] B23D *45/20*
U.S. Cl. 30—379.5 **11 Claims**



1. A self-propelled, self-steered vehicle for supplying power to a plurality of power driven plant trimming tools, comprising:

(a) a wheeled vehicle having a pair of driving wheels, a steered wheel rotatably mounted on a steered wheel carrier, said steering wheel carrier mounted at one end of the vehicle and pivotal about a vertical axis, an engine supported by the vehicle and drivingly connected with the driving wheels for propelling the vehicle along the ground, speed control means for controlling the speed of the vehicle, and a tool power source driven by the engine for providing power to a plurality of plant trimming tools;

(b) steering means connected to the steered wheel, said steering means including a pilot wheel adapted to be received in and to travel along a pre-formed furrow in a field, said pilot wheel rotatably mounted on a pilot wheel carrier, and lever means extending between and interconnecting the steered wheel carrier and the pilot wheel carrier, said pilot wheel carrier being pivotally connected to said lever means to pivot about a vertical axis, said steered wheel carrier secured to said lever means at a predetermined spacing from said pilot wheel carrier, wherein lateral movement of said pilot wheel causes pivotal movement of said lever about a vertical axis passing through said steered wheel carrier to turn said steered wheel in the direction of said lateral pilot wheel movement; and

(c) carrier means connected with said vehicle for carrying a plurality of conduits communicating with said tool power source to supply power to a plurality of individual plant trimming tools connected to the conduits, the carrier means including a supporting structure, and conduit means carried by the supporting structure and in communication with the tool power source, the conduit means terminating in a plurality of connectors to which plant trimming tools are adapted to be connected, the supporting structure including a central, upstanding boom, the boom carrying a pair of outwardly extending arms each supporting at least one branch conduit and connector.

4,694,578

MOTOR-DRIVEN CHAIN SAW

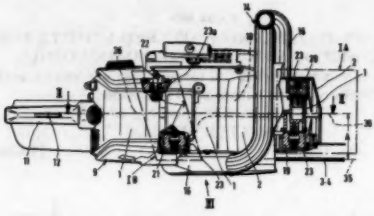
Ralf-Rainer Kemmler, Grossbottwar, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 886,905

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525593

Int. Cl.[4] B27B *17/00*

U.S. Cl. 30—383 **9 Claims**



8. A motor-driven chain saw comprising:

a housing having a front wall, a rear wall, two longitudinal side walls extending rearwardly from said front wall to said rear wall, and a base wall extending between said side walls;

a first handle on said rear wall of said housing for holding and operating the chain saw;

a saw chain;

a guide bar defining a guide-bar plane and being mounted on said housing for accommodating said saw chain for movement thereon;

an elongated extension arm defining a longitudinal axis and being mounted on said housing in the region of said base wall so as to extend in the direction toward the front of said chain saw, said extension arm having a top surface and including three mutually parallel rectangularly-shaped flat segments defining respective planes substantially perpendicular to said guide-bar plane, said flat segments being arranged one atop the other; and,

said extension arm further including first and second segments respectively interconnecting the top flat segment and the middle flat segment and said middle flat segment and the bottom flat segment, said first and second segments being located on opposite sides of said longitudinal axis;

a drive unit for driving said saw chain, said drive unit being supported on said extension arm above said top surface for driving said saw chain; and,

an elongated second handle mounted forward of said rear handle and having one end attached to said extension arm.

4,694,579

DEVICE FOR GUIDING A TOOL ALONG A CURVE

Björn Källberg, Box 6040, S-191 06 Sollentuna, Sweden

PCT No. PCT/SE85/00214, § 371 Date Jan. 22, 1986, § 102(e) Date Jan. 22, 1986, PCT Pub. No. WO85/05310, PCT Pub. Date Dec. 5, 1985

PCT Filed May 22, 1985, Ser. No. 834,243

Claims priority, application Sweden, May 23, 1984, 8402796

Int. Cl.[4] B43L *13/10*

U.S. Cl. 33—23.08 **4 Claims**

1. A device for guiding a tool (**17**) along a curve (**24**), said device comprising a holder (**16**) for the tool to be movable in one plane, and being so connected to a curve follower, which is adapted to follow a predetermined guide curve (**5**) in the same or another plane, that the holder (**16**) and the tool (**17**) follow a path corresponding to the path of the curve follower, said curve follower including a driven rotatable means (**44**) rigidly jointed to the holder (**16**) for the tool, and a freely rotatable means (**43**), both said rotatable means (**43, 44**) being movable towards each other so as to contact said guide curve (**5**) from either side thereof, a first arm (**38**) being mounted to be freely rotatable about the driven rotatable means (**43**) and carrying a second arm (**40**) journalled for swinging motion relative to said first arm (**38**), said second arm (**40**) carrying

said freely rotatable means (**43**), and spring means (**45**) acting between said first arm (**38**) and said second arm (**40**) to urge said freely rotatable means (**43**) towards said driven rotatable means (**44**).

4,694,580

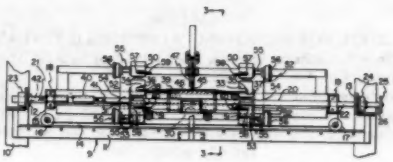
MACHINE FOR GUIDING AND MARKING PLYSTOCK

Robert W. Street, Kent, Ohio, assignor to General Tire, Inc., Akron, Ohio

Filed Jul. 24, 1986, Ser. No. 888,679

Int. Cl.[4] B43L *13/00;* **B65H** *25/26*

U.S. Cl. 33—32.6 **7 Claims**



1. A machine for monitoring the travel of a continuous piece of material used in the construction of a tire, comprising:

(a) a pair of horizontally spaced sensors when the machine is in operation for sensing opposing marginal edges of the piece of material;

(b) at least one support roll adjacent to the sensors for supporting the piece of material between the sensors as the piece of material travels past the sensors;

(c) means coacting with one of the sensors for simultaneously moving the sensors toward and away from each other when said one of the sensors senses lateral movement of the adjacent marginal edge of the piece of material relative thereto; and

(d) means coacting with the other of the sensors for simultaneously moving the sensors and support roll in the same lateral direction relative to the direction of travel of the piece of material, when the other sensor similarly senses lateral movement of the adjacent marginal edge of the piece of material.

4,694,581

HEIGHT-MEASURING DEVICE

William P. Heinrich, McHenry, and Norbert Leopoldi, Chicago, both of Ill., assignors to Genentech, Inc., San Francisco, Calif.

Filed Dec. 22, 1986, Ser. No. 944,006

Int. Cl.[4] G01B *5/02*

U.S. Cl. 33—169 R **11 Claims**

1. A height-measuring device for measuring the height of a person, comprising:

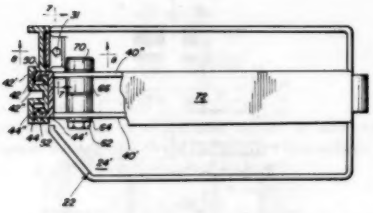
a ruler element having indices thereon, said ruler element being elongated and having a central longitudinal axis;

slide-mounting means integrally formed with said ruler element and coplanar therewith, said slide-mounting means being positioned at one longitudinal side of said ruler element such that said ruler element and said slide-mounting means form substantially one coherent unit;

said slide-mounting means having at least one longitudinally extending channel;

slide means having at least one slide-runner for sliding engagement and movement in said at least one channel;

height-measuring plate means having a lower, flat surface that may be placed upon the top of a persons's head who is being measured;



means for selectively locking and unlocking said slide means in said channel;

said slide means fixedly mounting said height-measuring plate means such that said plate means extends therebelow;

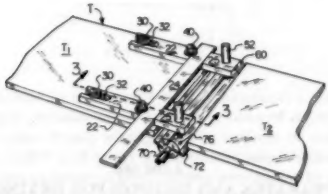
said channel being a substantially U-shaped channel having a first open face through which projects said slide-runner, and a second closed face, said slide-mounting means having a central rib about which is defined said U-shaped channel; said slide-runner being substantially L-shaped a portion of which is disposed adjacent to said central rib, so that said central prevents the outward removal of said slide-runner from engagement in said channel.

4,694,582

BLADE SETTING TOOL FOR WOOD JOINTER/PLANER MACHINES

Donald R. Walston, Jr., 402 E. Vandalia Rd., Greensboro, N.C. 27406

Filed Nov. 5, 1986, Ser. No. 927,129
Int. Cl.[4] B27G *23/00*
U.S. Cl. 33—635 **9 Claims**



1. A blade setting tool for wood jointer/planer machines of the type having a horizontal worksupporting/feeding table, a slot-type opening across the width of the table and through which rotatable knife blades are exposed for cutting the workpiece as the workpiece passes over the table; said blade setting tool comprising:

(a) a jig member having:

(i) means for adjusting the width of said jig to accomodate worktables of various width;

(ii) means for adjusting said jig along the longitudinal axis of said worktable and for securing said jig in a position wherein a portion of said jig overlies said slot opening in said table;

(iii) the said portion of said jig overlying said slot-type opening having an undersurface constituting a gauging surface for balancing said knife blades;

(b) a pair of spaced apart, vertically displaceable blade stops for stopping and retaining said knife blades at a prescribed point in the path of rotation; said blade stops being supported by said jig and being vertically displaceable from a first position in contact with said knife blades to a second position outside the path of rotation of said knife blades;

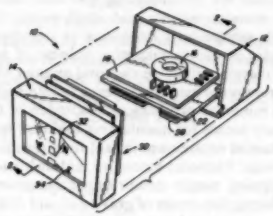
whereby a selected one of said knife blades is balanced against said gauging surface and said blade stops, and after balancing, said blade stops are displaced to said second position to allow the balanced blade to rotate past said blade stops, thereby moving subsequent blades into position for balancing while said jig member remains as originally positioned on said worktable.

4,694,583

ELECTRONIC AUTOMOTIVE COMPASS AND DISPLAY

Peter G. Blaney, Walnut Creek, Calif., assignor to Zemco Group, Inc., San Ramon, Calif.

Filed Mar. 26, 1986, Ser. No. 844,175
Int. Cl.[4] G01C *17/30*
U.S. Cl. 33—361 **15 Claims**



1. An electronic compass adapted for installation on a vehicle having a frontal display means for indicating vehicle direction relative to the major compass points and comprising:

dynamic indicia means including an array of reference bar means angularly spaced apart and extending radially from a common center point and associated letter legend means for indicating the four major compass points adjacent said reference bar means said letter legend means being located between said reference bar means so that each letter legend means can be activated in combination with one adjacent reference bar means on either side thereof;

fixed indicia means superimposed on said dynamic indicia means including means indicating the actual direction of travel of the vehicle;

flux gate compass means providing digital outputs proportional to the actual orientation of the vehicle with respect to the earth's magnetic North;

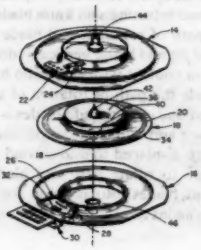
microprocessor means connected to said compass means for converting said digital compass outputs to directional control signals to activate computed combinations of said reference bar means and associated letter legend means of said dynamic indicia means, thereby making said computed combinations visible and indicating the present orientation of the vehicle relative to the major compass points.

4,694,584

REDUCED VOLUME DIGITAL INCLINOMETER

Floyd J. Mills, 815 Alpine #4, Boulder, Colo. 80302

Filed May 30, 1986, Ser. No. 869,198
Int. Cl.[4] G01C *9/06, 9/12*
U.S. Cl. 33—366 **6 Claims**



6. An inclinometer for generating information indicative of inclination angles comprising:

disk encoder means,

means for aligning said disk encoder means with gravitational field forces,

said disk encoder means having a plurality of encoding marks for providing high resolution positional data indicative of a rotational position of said disk encoder means resulting from alignment of said disk encoder means with gravitational field forces;

fluid means surrounding said disk encoder means for providing a supporting medium for said disk encoder means;

shell means for encapsulating said fluid means around said disk encoder means, said shell means having a shape which substantially conforms to the shape of said disk encoder means to minimize volume of said fluid means and, thereby minimize the total amount of expansion and contraction of said fluid means within said shell means so as to minimize mechanical distortions of the shell means;

buoyancy means for maintaining said disk encoder means in substantial equilibrium in said fluid means to substantially eliminate frictional forces on said disk encoder means;

said aligning means comprising counterweight means for displacing the center of gravity of said disk encoder means by creating a righting arm which aligns said disk encoder means with gravitational field forces; and

detector means for sensing said high resolution positional data to produce data signals indicative of inclination angles.

4,694,585

DEVICE FOR MEASURING CLEARANCE AROUND A PIN FOR CENTERING THE UPPER INTERNAL EQUIPMENT OF A PRESSURIZED WATER NUCLEAR

Alain Frizot, Montcenis; Gerard Cadaureille, Saint Bonnet de Mure; Jean-Christophe Lalére, Lyons, and Jean-Yves Machuron, Le Creusot, all of France, assignors to Framatome, Courbevoie, France

Filed Aug. 14, 1986, Ser. No. 895,984
Claims priority, application France, Aug. 14, 1985, 85 12398
Int. Cl.[4] G21C *17/00*
U.S. Cl. 33—502 **4 Claims**

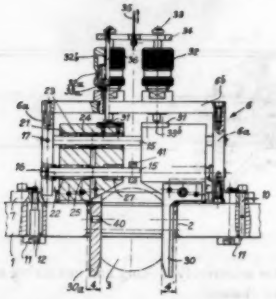
1. Device for measuring clearance around a pin (3) for centering the upper internal equipment of a pressurized water nuclear reactor on the lower internal equipment, placed in the reactor vessel which is open and filled with water, the lower internal equipment comprising the reactor core enclosure to which centering pins (3) are fixed, and the upper internal equipment comprising the upper core plate (1) in which slots (2) corresponding to the centering pins (3) are machined, characterized in that is comprises:

a carrier (6) integrally fixed to a pedestal (7) equipped with means (10, 11) intended to cooperate with holes (12) in the upper core plate (1) for fixing the carrier (6) on the upper core plate (1),

at least two travellers (15) mounted in the carrier (6) and parallel to the bearing surface of the pedestal (7) which is placed on the upper face of the upper core plate (1),

two movable slides mounted on the two travellers (15), each carrying a planar marking plate (31) parallel to the direction of movement of the slides (20) and each equipped with a sensing finger (30) projecting downwards relative to the bearing face of the pedestal (7),

resilient means (25) for returning the slides to bring them



back towards each other, in the direction of the travellers (15) and mounted within the carrier (6),

and a marking assembly carried by the carrier (6) and comprising two styli (33) mounted in guiding carriers (32) directed at right angles to the marking plates (31), each placed facing a marking plate (31) and pushed towards the plate (31) by a resilient means (36), and a control equipment (34) conected to the styli (33) and to a control cable (35) whose end away from the control equipment (34) enables a pull to be applied to separate the styli (33) from the marking plates (31), by compressing each of the pushing means (36), the styli moving to mark the plates (31) when the cable (35) is released.

4,694,586

APPARATUS AND METHOD FOR DRYING AND CURING COATED SUBSTRATES

David Reznik, 2151 Barbara Dr., Palo Alto, Calif. 94303

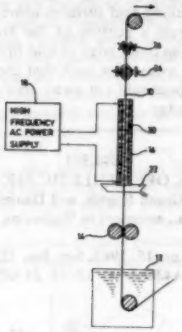
Continuation-in-part of Ser. No. 735,366, May 17, 1985. This application Aug. 13, 1986, Ser. No. 895,929
Int. Cl.[4] F26B *23/08*
U.S. Cl. 34—1 **21 Claims**

1. Apparatus for drying or curing a coating on a metal substrate comprising:

means for inductively heating said coated substrate in a highly confined space; and

means for condensing evaporated liquids released as the

result of said heating, said means for inductively heating and means for condensing being operative for maintaining



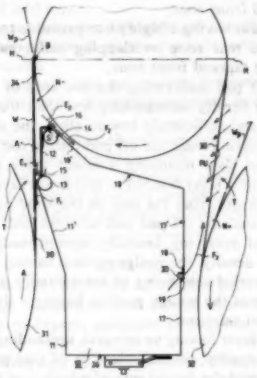
an atmosphere of evaporated liquids in said confined space, substantially to the exclusion of atmospheric gases.

4,694,587

METHOD AND APPARATUS IN A TWIN-WIRE CYLINDER DRYING SECTION OF A PAPER MACHINE

Pekka Eskelinen, Turku, Finland, assignor to Valmet Oy, Finland

Filed Sep. 9, 1986, Ser. No. 905,180
Claims priority, application Finland, Sep. 13, 1985, 853525
Int. Cl.[4] F26B *3/24, 13/08*
U.S. Cl. 34—23 **14 Claims**



1. A method in a twin-wire drying section of a paper machine which includes upper and lower rows of drying cylinders, an upper drying wire guided by surfaces of said upper drying cylinders and upper guide rolls situated between said upper drying cylinders, a lower drying wire guided by surfaces of said lower drying cylinders and lower guide rolls situated between said lower drying cylinders, wherein a web in pressed by said upper wire in direct drying contact with the surfaces of said upper drying cylinders and is pressed by said lower wire in direct drying contact with the surfaces of said lower drying cylinders, said web having a free draw of a certain length between the drying cylinder of one row and a drying cylinder of another row, comprising the steps of

in a space bounded by a first drying wire run leaving a first drying cylinder and going to a next guide roll, a free sector of said next guide roll, and a second drying wire run returning from said next guide roll and going to a second drying cylinder,

directing a first air jet proximate to said first drying wire run in a direction opposite to the running direction thereof;

at the same time directing a second air jet proximate to said free sector of said next guide roll in a direction opposite to the direction of rotation thereof;

said first and second air jets ejecting air from spaces behind them thereby creating a vacuum zone acting on at least a section of said first drying wire run;

said vacuum zone causing said web to be suctioned against said drying wire so that said certain length of said free web draw between a cylinder of one row and a cylinder of another row is substantially shortened;

directing a third air jet on said second run of said drying wire returning from said next guide roll and going to said second drying cylinder in a direction opposite to the running direction of said second drying wire for preventing air from being pumped through said second drying wire run from pockets defined within said drying section; and

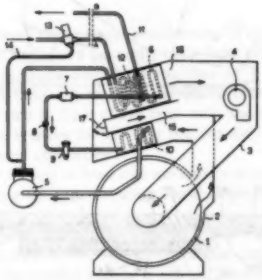
regulating the distribution of said third air jet in the transverse direction of said drying wire to control the transverse moisture profile of the web.

4,694,588

DRY CLEANING MACHINE

Alain Bagolin, Dijon, and Joël Gay, Saulon La Chapelle, both of France, assignors to Frimair S.A., Longvic, France

Filed May 28, 1986, Ser. No. 869,015
Claims priority, application France, Jun. 5, 1985, 85 08458
Int. Cl.[4] F26B *21/10*
U.S. Cl. 34—77 **10 Claims**



1. A dry cleaning machine comprising: a rotating drum (1) disposed in an enclosed chamber (2); an air flow duct (3) in a closed-loop relationship with the chamber (2); means (4) for impelling air through the air flow duct (3) toward the chamber (2) and a cooling circuit having an evaporator (10) disposed in the air flow duct (3) and a single condenser (6) disposed therein downstream of the evaporator (10) as considered in the direction of air flow in the air flow duct (3), wherein a temperature control circuit (11) having an internal heat exchanger (12) is interlaced at least to some extent with the condenser (6) in the air flow duct (3); and means (13) to control the flow of a fluid in the control circuit (11) and to operate in dependence upon the pressure in the cooling circuit.

4,694,589

ELASTOMERIC SHOE INNERSOLE

James B. Sullivan, and Richard B. Box, both of Perseverance Way, Hyannis, Mass. 02601

Continuation of Ser. No. 777,459, Sep. 18, 1985, Pat. No. 4,627,178, which is a division of Ser. No. 470,638, Feb. 28, 1983, Pat. No. 4,581,187. This application Dec. 9, 1986, Ser. No. 939,746

The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.

Int. Cl.[4] A43B *13/40*

U.S. Cl. 36—44 **15 Claims**

1. A molded shoe innersole for employment in footwear to provide support and cushioning to the foot, which innersole comprises a contoured heel and arch section having a generally flat, lower surface and a heel and arch, contoured top surface, the heel and arch sections contoured to provide a contoured arch section and a heel cup section composed of a molded, resilient, elastomeric, open-cell, polyurethane foam material of low compression set, and a top flexible sheet material bonded to the upper surface of the heel section said lower surface of the heel and arch section tapering into the plane of the bottom surface of the said sheet material.

4,694,590

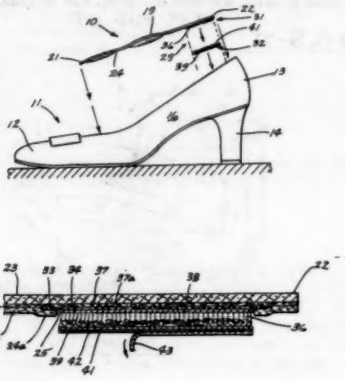
ARCH SUPPORT UNIT AND METHOD OF FORMATION

Kent S. Greenawalt, 1100 Mela Dr., Dubuque, Iowa 52001

Filed Apr. 3, 1986, Ser. No. 847,679

Int. Cl.[4] A43B *7/22*

U.S. Cl. 36—91 **1 Claim**



1. A separable fastener device adapted for use in securing a removable arch support to an internal portion of a shoe comprising:

first and second pads, said first pad comprising a circular, rigid planar element, with a second pad comprising a circular planar second element;

means applied to one side of said first element for attaching said first element to said removable arch support;

surface bearing pressure responsive adhesive means applied to one side of said second element for attaching said second element to said internal portion of said shoe; and

means attached to each of the other sides of said first and second elements providing releasable interengagable mating surfaces on said other sides wherein said mating surfaces engage upon pressing together said surfaces and release upon pulling said surfaces apart;

and further wherein a portion of the arch support is cut away and with an outer edge of said first element inserted within said cut away area such that the periphery of the arch support about said cut away area overlaps said first element outer edge.

4,694,591

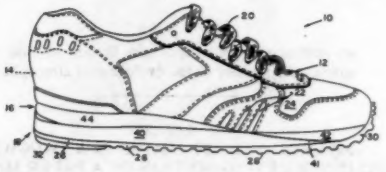
TOE OFF ATHLETIC SHOE

Howard P. Banich, Grand Rapids, and Daniel E. Norton, Rockford, both of Mich., assignors to Wolverine World Wide, Inc., Rockford, Mich.

Filed Apr. 15, 1985, Ser. No. 723,197

Int. Cl.[4] A43B *5/00, 13/18, 23/08, 13/12*

U.S. Cl. 36—102 **5 Claims**



1. An athletic shoe having an outsole, an upper, and a midsole subassembly therebetween, said midsole subassembly comprising:

a compressible layer having a rear portion extending forwardly from the rear of the shoe toward the toe of the shoe but terminating short of the front end of the shoe in a tapered front zone;

said layer also having a highly compressible toe off pad with a tapered rear zone overlapping and bonded integrally with said tapered front zone;

said toe off pad underlying the toe area of the shoe and having a density substantially less than that of said rear portion, and sufficiently low to allow the user's metatarsals to sink into said toe off pad during toe off action;

said athletic shoe including a lower layer and an upper compressible layer bonded to said lower layer and extending forwardly from the rear of the shoe but terminating short of said toe off pad and wherein said upper layer is formed of overlying, laterally tapered wedge portions of different density, the wedge portion having a thicker edge on the medial side being of substantially greater density than that of the wedge portion having a thicker edge on the lateral side; and

said upper layer having an integral, upstanding stability heel cup, the medial side of which is of said greater density material and the lateral side of which is of the lesser density material.

4,694,592

CLOSURE DEVICE PARTICULARLY FOR REAR ENTRANCE SKI BOOTS

Giorgio Baggio, San Martino Di Lupari, and Renzo Balbinot, Vittorio Veneto, both of Italy, assignors to Nordica S.p.A., Montebelluna, Italy

Filed Jan. 3, 1986, Ser. No. 815,858

Claims priority, application Italy, Jan. 11, 1985, 20468/84 [U]

Int. Cl.[4] A43B *5/04*

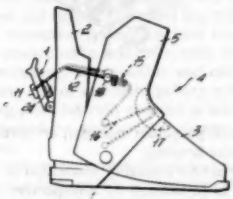
U.S. Cl. 36—117 **6 Claims**

1. In a ski boot with a longitudinal extension a widthwise extension and an upwards extension and having a shell with a front quarter formation and a rear quarter formation hinged thereon to oscillate about an axis extending in said widthwise direction,

a closure device for closing said rear quarter formation relative to said front quarter formation, comprising

a lever articulated to the rear portion of said rear quarter formation about an axis extending in said widthwise direction to assume a first angular position when said closure device performs its closing function and a second angular position when said closure device leaves open said front quarter formation and said rear quarter formation relative to each other, said lever having guide means formations thereon, said lever having a first side facing towards said rear quarter formation when said lever is in said first angular position and a second side opposite to said first side and facing away from said rear quarter formation when said lever is in said first angular position thereof, said second side facing towards said rear quarter when said lever is in said second angular position thereof and said first side facing away from said rear quarter formation when said lever is in said second angular position thereof,

a block member slidable on said lever at said first side



thereof along said guide means formations thereof, said block member having locking means thereon for selectively locking at said first side of said lever said block member in a selected position along said guide means formations,

control means for selectively controlling the locking action of said locking means, said control means being arranged at said second side of said lever,

cable means associated with said block member and having at least one portion thereof secured to said front quarter formation, and

further guide means in said rear quarter formation and in said front quarter formation for guiding therein said cable under operation,

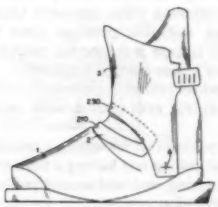
thereby to allow an adjustable closing and opening degree of said rear quarter formation with respect to said front quarter formation when said lever assumes said first and said second angular position depending on the locking position of said block member on said lever member.

4,694,593

SKI BOOT WITH SPRING ACTION FLEX CONTROL

Roland Petrini, Chambéry, and Joseph Morell, Annecy-Le-Vieux, both of France, assignors to Salomon S.A., Annecy, France

Filed Jan. 13, 1984, Ser. No. 570,643
Claims priority, application France, Jan. 14, 1983, 83.00796
Int. Cl.[4] A43B *5/04*
U.S. Cl. 36—120 **37 Claims**



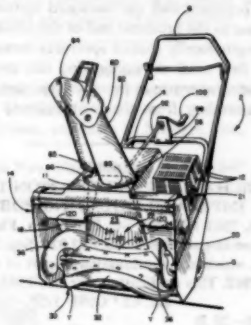
2. A ski boot comprising a rigid shell base on which a cuff is journalled to pivot around a transverse axis, and flexion means for affecting the flexional characteristics of the cuff, said flexion means comprising a dihedral shaped spring member positioned between said cuff and said shell base, said spring member being a unitary element distinct from said cuff and/or shell base, whereby said spring member may be removed and replaced as desired, said spring member being positioned to at least partially extend around the instep of the boot and being adapted to work in tension as well as compression.

4,694,594

SINGLE STAGE SNOWTHROWER

Richard A. Thorud, Bloomington, and Donald M. White, III, Chanhassen, both of Minn., assignors to The Toro Company, Minneapolis, Minn.

Filed Sep. 12, 1985, Ser. No. 775,288
Int. Cl.[4] E01H *5/09*
U.S. Cl. 37—244 **35 Claims**



1. An improved single stage snowthrower of the type having a housing that includes a generally open front portion defined by spaced side walls connected together by a rear wall; a rotatable snowthrowing impeller extending between the side walls and located in front of the rear wall; and engine means carried by the housing for rotating the impeller: and wherein the improvement comprises:

an impeller having at least one outwardly extending paddle for picking up and throwing snow, wherein the paddle comprises:

(a) a central snowthrowing section which extends over at least the middle one-half of the entire paddle's length, wherein the central section is curved forwardly from the midpoint to each side thereof to be generally concave such that snow is thrown in a stream that tapers inwardly as it rises from the central section;

(b) two end sections located on each side of the central section which fill out the remaining length of the paddel, wherein each end section comprises a relatively small portion of one turn of a helical auger having a relatively small pitch in relation to the paddle's length; and

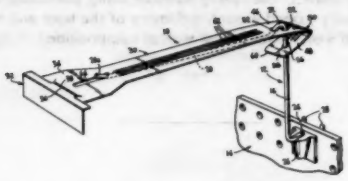
(c) wherein the central snowthrowing section faces forwardly with respect to a radial line extending from the axis of rotation of the central section, wherein the amount of the forward facing is from 5° to 20° at the midpoint of the central section and is approximately 0° at each side of the central section.

4,694,595

PRODUCT INFORMATION DISPLAY TAG

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed Jun. 19, 1986, Ser. No. 876,166
Int. Cl.[4] A47F 7/00
U.S. Cl. 40—19.5 11 Claims



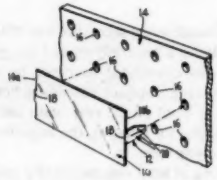
1. An elongate product information and display tag blank of plastic sheet comprising an elongate portion and an adjacent mounting portion particularly adapted for securing the blank on a skyhook structure having vertical and horizontal limbs joining at a hump-like bend between the vertical and the horizontal limbs of the structure, the mounting portion having an inboard section adjacent the elongate portion, an outboard section connected to the inboard section by a transverse bend line and a proximal end, the outboard section extending from the bend line to the proximal end of the blank, a pair of axially located longitudinally spaced apertures formed in the inboard section, a first axial slit connecting the apertures, a further axially located aperture in the outboard section, and a second axial slit extending from the proximal end into said further aperture.

4,694,596

MERCHANDISE INFORMATION TAG WITH IMPROVED MOUNTING PORTION

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Continuation-in-part of Ser. No. 422,010, Sep. 23, 1982, Pat. No. 4,539,766, which is a continuation-in-part of Ser. No. 358,925, Mar. 17, 1982. This application Apr. 23, 1985, Ser. No. 726,357
Int. Cl.[4] G09F 3/08
U.S. Cl. 40—20 R 3 Claims



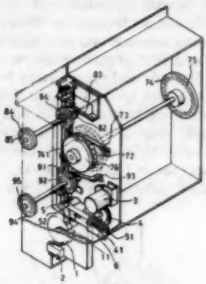
1. A merchandise information tag comprising a body member of plastic sheet material including a substantially planar sheet material body portion and sheet material projections integral with the body portion extending respectively in the same plane as said body portion from opposite sides of the body portion, neck portions connecting said projections to said body portion so that said projections can be folded substantially at right angles to said body portion for insertion in spaced holes of a perforated board structure or the like for mounting the body portion substantially face-to-face with a surface of the perforated board structure when the projections are extended behind the body portion, wherein each projection has a base portion with parallel sides adjacent the neck portion, and an end portion with tapered converging sides, and wherein each projection is slit longitudinally into a pair of fingers to be squeezed together when inserted in the respective opening for holding the projection in the opening by friction.

4,694,597

ELECTRIC PERPETUAL CALENDAR

Sheu Kuei-Wen, No. 160, Chin Chou St., Taipei City, Taiwan

Filed Oct. 15, 1985, Ser. No. 788,204
Int. Cl.[4] G09D 3/10
U.S. Cl. 40—117 4 Claims



1. An electric perpetual calendar, comprising:

(a) a calendar housing;

(b) a drive wheel rotatably journalled in said housing and adapted to be rotated by a respective gear through one cycle per 24 hours, and said drive wheel having on its peripheral edge a cam formation for actuation of a respective micro-switch;

(c) a gear mounted in said housing for rotating said drive wheel through a respective cycle;

(d) a micro-switch mounted in said housing and arranged in an electric circuit including at least one motor, whereby said micro-switch can be actuated by rotation of said drive wheel and contact of its cam formation;

(e) an eccentric wheel journalled in said housing and including a pin, said eccentric wheel being driven to rotate by said at least one motor;

(f) a retractable rod having a first, front end and a second, rear end remote from said front end, said front end having a slot formation for operatively receiving therein said pin of said eccentric wheel; and said rear end of said retractable rod being connected to respective pulling rods for control of the date and week-day indication in said calendar; and said retractable rod including a fulcrum about which said retractable rod is pivoted to swing up and down due to the respective movements imparted to it by said eccentric wheel and said pin in said slot formation;

(g) a first pulling rod for setting a date, said first pulling rod having a first, top end and a second, lower end remote from said top end, said top end being biased by a respective spring, and said lower end being operatively connected to said retractable rod, and said lower end having a notch formation and a formation for securing a respective string;

(h) a spring operatively connected in said calendar housing and at said top end of said first pulling rod;

(i) a first positioning piece mounted laterally at said first pulling rod, said first position piece being adapted to operatively engage a respective ratchet wheel upon the changing of a date being completed;

(j) a ratchet wheel rotatably mounted on a respective shaft in said housing for cooperation with said first positioning piece;

(k) a second pulling rod for setting a month in said calendar, said second pulling rod having a first, top end biased by a respective spring, and said second pulling rod also having a notch formation;

(l) a spring operatively connected in said calendar housing and at said top end of said second pulling rod;

(m) a second positioning piece mounted laterally at said

second pulling rod, said second positioning piece being adapted to operatively contact a respective ratchet wheel;

(n) a ratchet wheel rotatably mounted on a respective shaft in said housing for cooperation with said second positioning piece so as to be fixed in position on rotation;

(o) a control lever operatively mounted a said second pulling rod, said control lever having a first, front arm and a second, rear arm remote from said first arm, said front arm adapted to operatively contact a notch formation on a respective cam wheel, and said rear arm being adapted to engage said notch formation in said first and second pulling rods, whereby said first pulling rod for setting the date in said calendar and said second pulling rod for setting the month in said calendar are jointly moved so as to change the month;

(p) a cam wheel having at least one notch formation, said cam wheel mounted on a respective shaft in said housing;

(q) a third pulling rod for setting a week-day in said calendar, said third pulling rod having a first, top end and a second, lower end remote from said top end, said top end biased by a respective spring, and said lower end being operatively connected to said retractable rod;

(r) a spring operatively connected in said calendar housing and at said top end of said third pulling rod;

(s) a positioning piece laterally secured at said third pulling rod and adapted to operatively contact a respective ratchet wheel;

(t) a ratchet wheel operatively mounted on a respective shaft in said calendar housing for cooperation with said positioning piece of said third pulling rod for being engaged and fixed thereby upon a week-day being changed; and

(u) for each pulling rod at least one shaft operatively journalled in said housing;

(v) for each pulling rod at least one pair of loose-leaf mounting wheels, with each pair being mounted on the respective shaft of the associated ratchet wheel, and about the rim of said wheels a plurality of holes is furnished for mounting respective loose-leaf date indicators; and

(w) a plurality of loose leaves indicative of date, week-day, and month in said calendar, respectively arranged on corresponding pairs of wheels;

wherein upon said first and second, date pulling rods and said third, week-day pulling rod being pulled downwards, the respective ratchet wheels wll drive respective loose-leaf mounting wheels to rotate respectively to change the date and the week-day; and

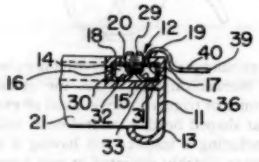
wherein said first, date pulling rod can, by way of said control lever, drive said second, month pulling rod downwards to cause the respective ratchet wheel to rotate the respective pair of loose-leaf mounting wheels for changing the loose-leaf indicative of the month.

4,694,598

COMPRESSION CLAMP FOR A PICTURE FRAME

Helmut Eisenloeffel, North Royalton, Ohio, assignor to Valco/-Valley Tool & Die, Inc., North Royalton, Ohio

Filed Aug. 21, 1986, Ser. No. 898,636
Int. Cl.[4] G09F *1/12*
U.S. Cl. 40—155 **3 Claims**



1. A clamping device for attaching a first member to a second member which has a longtudinally extending channel with a rectangular cross-section which is defined by a flat bottom wall, a pair of sidewalls extending from the bottom wall in parallel relation, and a pair of flanges which extend from the sidewalls in aligned parallel relation with the bottom wall and which terminate in spaced relation to form an opening between them, the device comprising:

(a) at least one flat plate which is designed to rest in close proximity to the flanges, the plate having at least one opening therein, the opening being located between the flanges;

(b) a screw threadably received in the opening and rotatable therein to and from the bottom wall of the channel, the screw having a flat distal end within the channel closest the bottom wall, the screw having a diameter which is at least as large as the diameter of the opening;

(c) a pair of resilient arms extending from opposing marginal edges of the plate on opposite sides of the opening, the arms extending along the adjacent sidewalls and then towards each other partially along the bottom wall and then terminating at distal ends which converge towards each other in the direction of the opening and terminate in closely spaced relation to engage the flat end of the screw, the spacing between the distal ends of the arms being less than the diameter of the screw to prevent the screw from passing between them;

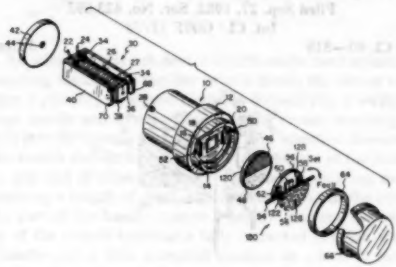
the screw, when rotated towards the bottom wall, designed to engage the distal ends of the arms and force them apart and towards the bottom wall to move the arms and attached plate into compressive engagement with at least the bottom wall and flanges of the channel.

4,694,599

ELECTROMAGNETIC FLIP-TYPE VISUAL INDICATOR

Robert D. Hart, Collinsville, and John J. Ambrozaitis, Waterbury, both of Conn., assignors to Minelco, Inc., Thomaston, Conn.

Filed Nov. 27, 1985, Ser. No. 802,647
Int. Cl.[4] G09F *9/00*
U.S. Cl. 40—449 **26 Claims**



1. An electromagnetic indicator for providing binary indication of first and second conditions comprising:

a housing;

a flag assembly rotatably mounted in said housing so that said flag assembly is rotatable between a first and a second position, said first position indicating said first condition and said second position indicating said second condition, said flag assembly being permanently magnetized in at least one portion;

magnetic latching means comprising bracket means having a first end and a second end, and a core bar means, said bracket and core bar means being mounted within said housing so that said ends of said bracket and core bar means are near said flag assembly;

electromagnetic means mounted within said housing, said electromagnetic means comprising at least one electromagnet having a core and a winding therearound, said electromagnetic means having first and second ends, said bracket means being magnetically connected to said first

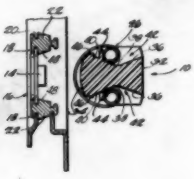
end of said electromagnetic means, said second end of said electromagnetic means being magnetically connected to said core bar means and being near said flag assembly, said winding being connectable to an electrical power source so that when said electromagnetic means is connected to said electrical power source said electromagnetic means is able to generate a magnetic field whereupon said bracket means, said ends of said bracket means and said core bar means become magnetized to produce a magnetic field, the magnetic field of said ends of said bracket means and said core bar means interacting with the magnetic field of said magnetized portion of said flag assembly to cause said flag assembly to rotate from said first position to said second position and become magnetically latched in said second position by the magnetic attraction between said ends of said bracket means and said core bar means and said magnetized portion of said flag assembly, or to cause said flag assembly to rotate from said second position to said first position and become magnetically latched in said first position by the magnetic attraction between said ends of said bracket means and said core bar means and said magnetized portion of said flag assembly, said magnetic latching to continue after said electromagnetic means is disconnected from said electrical power source.

4,694,600

INDICIA DISPLAY MODULE USING LIGHT PIPE

Ledell L. Murray, Noblesville, Ind., assignor to General Indicator Corporation, Pardeeville, Wis.

Filed Sep. 27, 1982, Ser. No. 423,692
Int. Cl.[4] G09F *11/18*
U.S. Cl. 40—518 **3 Claims**



1. A display module comprising,

a bezel having an aperture therein,

a clear plastic light pipe mounted on the back of the bezel and having a rearwardly facing surface which accepts light,

said light pipe having opposed sides which converge and then diverge going from the rear to the front of the module,

said light pipe having a generally flat front surface through which light is emitted, the light entering the rear surface being internally reflected forward to the front surface,

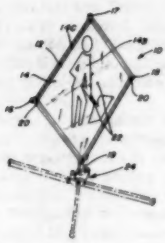
a coiled generally opaque indicia strip having translucent or transparent indicia thereon, the coiled ends of the strip being supported in the cavities on opposing sides of the light pipe which cavities are formed by the converging and diverging sides whereby the strip extends across the front of the module between the light pipe and the bezel and selected indicia on the strip are displayed at the aperture.

4,694,601

PORTABLE COLLAPSIBLE HIGHWAY SIGN

Grant D. Dicke, Downers Grove, and Jeffrey A. Williams, Bolingbrook, both of Ill., assignors to Dicke Tool Company, Downers Grove, Ill.

Filed Nov. 18, 1985, Ser. No. 799,302
Int. Cl.[4] G09F *10/00*
U.S. Cl. 40—610 **11 Claims**



10. An improved portable collapsible sign comprising:

a flexible panel,

a frame comprising four (4) rigid arms attached to a rigid central web, wherein said central web is composed of four (4) channel sections firmly secured to a rigid plate enabling each of said arms to be pivotally mounted through one of said channels of said central web,

fastening means attaching said message panel to said arms and said central web,

releasably securing means attached to each of said arms and to protrude through a hole in each of said channel sections for locking said arms in an extended position in the form of a cross and firmly holding said message panel in position,

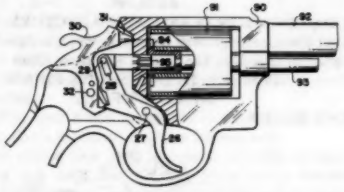
pivot means connecting said arms to said central web to enable said arms and, said sign panel to be folded down in a single direction of fold and form a compact bundle whereby the panel is fastened to the inward side of each arm so as to be within the arms when folded and having large area fastening means.

4,694,602

REVOLVER HANDGUN

Klaus O. M. Pust, 935 Ashton St., Jacksonville, Fla. 32208

Filed Jun. 17, 1986, Ser. No. 875,069
Int. Cl.[4] F41C *1/00, 1/02*
U.S. Cl. 42—59 **8 Claims**



1. A revolver handgun having a revolving cylinder, a trigger and hammer mechanism that causes the cylinder to rotate when the hammer or trigger is moved, and an extractor assembly with a star shaped head, a central bore, and a shaft; said mechanism including a transfer rod having a transverse pin therein and being slidably mounted in said bore to move linearly therein when said trigger is pulled or said hammer is moved; said trigger having an upwardly extending member with a slot therein which engages said pin and is adapted to cause said rod to slide in said bore when said trigger or said hammer is moved; one of said rod and said bore having a

network of grooves on its surface to mate with a plurality of radially directed protrusions on the surface of the other of said rod and said bore whereby linear movement of said rod causes progressive radial rotation of said extractor assembly, said shaft of said extractor assembly being mounted in a central bore in said cylinder by means permitting relative linear movement but no relative rotational movement, said network of grooves providing a pathway of repeating cam sections each having a first location where said trigger and hammer are in their normal positions after firing, and a second location where said cartridge primer and said hammer are aligned and said trigger and hammer are in firing position.

4,694,603

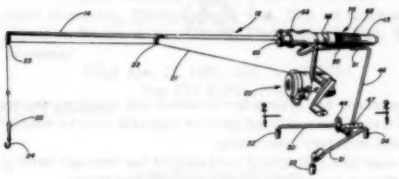
FISHING DEVICE

Laurel L. Anderson, 6721 23rd Ave., Kenosha, Wis. 53140

Filed Jan. 9, 1986, Ser. No. 817,453

Int. Cl.[4] A01K *97/10*

U.S. Cl. 43—21.2 **17 Claims**



1. A fishing device particularly useful for ice fishing comprising a supporting stand, a fishing pole having a rod and a handle, a reel mounted on said handle, means pivotally mounting the fishing pole to the supporting stand at a pivot point intermediate the reel and the forward end of the rod, and means for adjusting the mounting of the reel to the handle lengthwise of the handle to achieve a balance of the fishing pole about said pivot point.

4,694,604

GAS OR VAPOR DISPERSING APPARATUS

Arthur W. Mitchell, Sandyacre, 18 Ballyardle Road, Kilkeel, County Down, Ireland

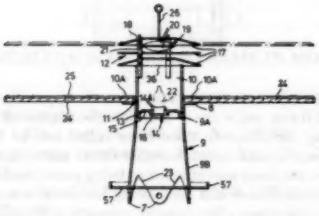
PCT No. PCT/GB81/00133, § 371 Date Mar. 9, 1982, § 102(e) Date Mar. 9, 1982, PCT Pub. No. WO82/00079, PCT Pub. Date Jan. 21, 1982

Continuation-in-part of Ser. No. 843,878, Mar. 26, 1986, abandoned, which is a continuation of Ser. No. 783,065, Oct. 2, 1985, abandoned, which is a continuation of Ser. No. 359,652, Mar. 9, 1984, abandoned. This PCT application Jul. 7, 1981, Ser. No. 901,999

Claims priority, application United Kingdom, Jul. 8, 1980, 8022349; Mar. 6, 1981, 8117035

Int. Cl.[4] A01M *1/02, 1/14, 5/06, 13/00*

U.S. Cl. 43—114 **18 Claims**



1. Apparatus for dispersing a gaseous or vaporized pheromone into the atmosphere, comprising a first housing within which at least one pheromone-releasing source holding means is located, the housing having at its top and outlet, upward-draft creating means provided on said first housing which has adjacent to or below the, or each holding means, air introducing means, wherein the upward-draft creating means is mounted over the outlet, and comprises a series of annular vanes, the uppermost and lowermost of which are parallel and of frusto-conical shape or substantially of frusto-conical shape, a central aperture in each said vane, a common axis about which the vanes are centered and arranged in predetermined vertical spaced relationship, a plurality of supports parallel to and radially spaced from said axis, the lowermost of said vanes converging inwardly toward the next upper vane which is usually horizontal and planar in a diameter towards the common axis but may have a frusto-conical profile of shallower angle than the uppermost and lowermost vane forming a venturi, a device of aerodynamic shape mounted co-axially with the vanes and located between the upper two vanes, the device masking but not closing the central apertures in said vanes, and having upper and lower cone-like or dish-shaped air-deflecting walls arranged base-to-base about said common axis, the upper wall of the device being parallel or substantially parallel to the uppermost and lowermost vanes.

4,694,605

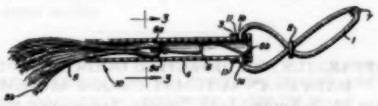
MOSQUITO ELIMINATOR

Armando Garcia, 4821 Cheryl St., Corpus Christi, Tex. 78415, and David V. Nesmith, 3805 Reynosa St., Corpus Christi, Tex. 78416

Filed Jul. 31, 1986, Ser. No. 891,373

Int. Cl.[4] A01M *3/02*

U.S. Cl. 43—137 **6 Claims**



1. An adjustable switch device which can be used selectively in swatting insects and the like or as a brush, the device comprising a plurality of strand elements formed into a switch, a tubular handle and an adjustable securing means attaching the switch into the handle for adjustable and selective movement of the switch therein to expose different lengths of the strands from one end of the handle as required, said securing means comprising a length of cord securing a rear end of the switch to the part of the handle remote from said one end for movement of the switch between a fully retracted position within the handle and a fully extended position in which at least a major length of the switch is exposed from said one end, said handle having a cap on the end opposite said one end and said cord being trapped between the handle and the cap.

4,694,606

SEEDING PROCESS AND APPARATUS

Donald C. Wood, and James D. Wood, both of 2810 Camino Tassajara, Danville, Calif. 94526

Filed Mar. 5, 1985, Ser. No. 708,444

Int. Cl.[4] A01C *1/04*

U.S. Cl. 47—56 **16 Claims**

1. A device for planting seed tape in soil comprising:

a. a support structure;

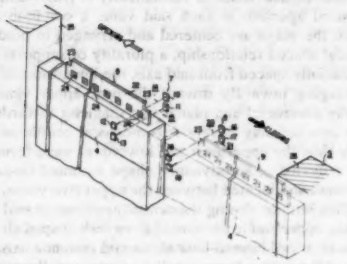
b. means for moving said support structure along the surface of the soil;

c. means for advancing the seed tape relative to the movement of said support structure by said moving means, said seed tape advancing means and seed tape being mounted on said support structure;

d. a cutter, means driving said cutter to cause repeated severing of sections from the seed tape in timed relation

with the advancement of the seed tape by said means for advancing the seed tape; and,

e. means for folding each severed seed tape section and forcing a severed seed tape section from the support structure into the soil to a selected soil depth, said means for



folding and forcing including means for maintaining each said seed tape section in a unitary form at said selected soil depth and means reciprocatingly mounting said folding and forcing means on said support structure for pendular, swinging movement.

4,694,607

APPARATUS FOR DETECTING DOOR MOVEMENT DATA IN AN AUTOMATIC DOOR SYSTEM

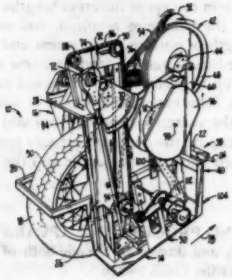
Takao Ishida, Kurobe; Yukio Yoshida, Namerikawa, and Kenzo Ohno, Toyama, all of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan

Filed Jun. 23, 1986, Ser. No. 877,540

Claims priority, application Japan, Jun. 24, 1985, 60-135933

Int. Cl.[4] E05F *15/20*

U.S. Cl. 49—25 **9 Claims**



1. An apparatus for detecting door movement data in an automatic door system, comprising a door frame in which a slide door is provided so as to be freely moved in the opening and closing directions, an opening-direction sensor and a closing-direction sensor mounted on a horizontal member of said door frame, a dog having a predetermined horizontal length and mounted on said door, said dog having a plurality of actuating portions adapted to turn ON or OFF said opening-direction and closing-direction sensors and disposed on said dog at a predetermined space interval in the longitudinal direction thereof.

4,694,608

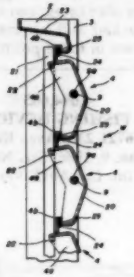
SECURITY BAR SYSTEM FOR LOUVERED WINDOW UNITS

Earl B. Lambert, 9-1 Peppertree Ter., Christiansted, St. Croix, V.I. 00820

Filed Jun. 2, 1983, Ser. No. 501,636

Int. Cl.[4] E06B *3/68*

U.S. Cl. 49—50 **14 Claims**



1. A security bar system for windows and window openings in which each has a defined open or openable area surrounded by a solid structure comprising:

a. at least one cylindrical cut resistant bar member having a sufficient length to extend across the open area;

b. apertures in each end of said bar member;

c. a pair of stub shafts rotatably mounted in said apertures where said bar member and stub shafts freely rotate;

d. a pair of mounting apertures in the solid structure surrounding the open area for receiving one end of the stub shaft; and

e. a cylindrical, cut resistant sleeve rotatably mounted on said bar member and covering the bar and the exposed area of said stub shafts.

4,694,609

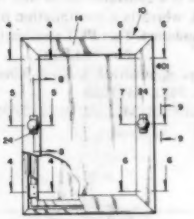
DOUBLE-HUNG CLOSURE FOR ACCESS OPENINGS

Mohammad T. Torabi, 6657 S. Penrose Ct., Littleton, Colo. 80121

Filed Dec. 15, 1986, Ser. No. 941,760

Int. Cl.[4] E05D *15/50*

U.S. Cl. 49—193 **8 Claims**



1. For use in combination with an access opening bordered by a fixed frame and a cover therefor, the improved assembly for hinging the cover to open from either side of the frame which comprises: an outer movable frame and an inner movable frame, the inner movable frame being positioned inside the outer movable frame and each being movable independently relative to the other; a first hinged connection hingedly attaching the inner movable frame to the fixed frame on one side of the fixed frame; a second hinged connection having a hinge axis paralleling said first hinged connection hingedly attaching the inner movable frame to the access opening cover on the

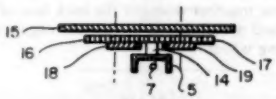
other side of said access opening; a third hinged connection with a hinge axis in common with said second hinged connection hingedly attaching the outer movable frame to the fixed frame on said other side of the access opening; and, a fourth hinged connection with a hinge axis in common with said first hinged connection hingedly attaching the outer movable frame to the access opening cover on said one side of the access opening, said inner movable frame and access opening cover cooperating with one another and with the first and fourth hinged connections to define a first unitary subassembly operative to cover and uncover the access opening by hinging the cover therefor on said one side of the latter, and said outer movable frame and access opening cover cooperating with one another and with the second and third hinged connections to define a second unitary subassembly operative to cover and uncover the access opening by hinging the cover therefor on said other side of the latter.

4,694,610

CABLE WINDOW LIFT FOR VEHICLES

Lothar Hornivius, Ehringshausen, Fed. Rep. of Germany, assignor to Kuster & Co. GmbH, Ehringhausen, Fed. Rep. of Germany

Filed Apr. 22, 1985, Ser. No. 725,703
Int. Cl.[4] E05F *11/48*
U.S. Cl. 49—351 **4 Claims**



1. A cable window lift mounted in a vehicle for adjusting a one piece window pane with a plane having a shortened lateral groove guidance on one side of said pane, comprising:

(a) a vertical U-shaped guide rail;

(b) a continuous cable mounted for vertical movement in said guide rail;

(c) a drive roller connecting said cable for actuating said vertical movement;

(d) a brace joined to the lower edge of said window pane and having guidance groove means extending perpendicularly to said vertical U-shaped guide rail;

(e) means connecting said brace to said cable and for sliding on said guide rail; and

(f) a first support arm having a first end engaging said guidance groove means and a second end rigidly joined to a first gear, a second support arm having a first end engaging said guidance groove means and a second end rigidly joined to a second gear, said first and second gears mutually meshing and mounted for rotation on a plate which, in turn, is mounted on said guide rail,

whereby said support arms prevent tilting of said window pane in the direction of said plane of said window pane.

4,694,611

CONSTRUCTION OF DOOR FRAME IN MOTOR VEHICLE

Katsuhiro Okumura, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Aug. 15, 1985, Ser. No. 765,932
Claims priority, application Japan, Aug. 24, 1984, 59-128069[U]
Int. Cl.[4] E05D *15/16*; E06B *7/16*
U.S. Cl. 49—441 **6 Claims**

1. A construction of a vehicle door, comprising:

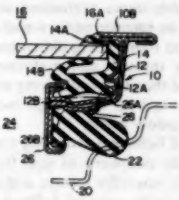
a door frame mounted on the vehicle door for slidably supporting a door glass;

a guide portion formed on said door frame for receiving an end edge of said door glass, said guide portion being substantially vertically disposed along said door frame;

a seal member connected to said guide portion for sealingly engaging said end edge and for guiding said door glass being slidably positioned along said guide portion;

a door weather strip;

a channel formed on said door frame for supporting said door weather strip and for positioning said door weather strip in contact with a vehicle body when the door is closed, said guide portion and said channel being formed of a plate having a substantially two-ply configuration for



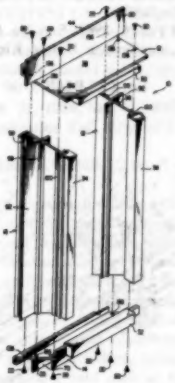
reinforcing said channel and said guide portion, the two-ply configuration of said plate defining wall members for said channel and said guide portion, said plate also defining an enclosed section formed between said wall members for providing engagement between said wall members to increase the rigidity of said door frame, wherein said enclosed section has a generally elongated triangular shape, so that said wall member of said guide portion engages said wall member of said channel to brace said wall members and thereby control the deformation of said enclosed section.

4,694,612

WOOD-CLAD ALUMINUM WINDOW FRAME AND ASSOCIATED WINDOW ASSEMBLY

Charles W. Pruden; Alfred P. McEvoy, and Charles S. McEvoy, all of Dallas, Tex., assignors to Western Extrusions Corporation, Carrollton, Tex.

Filed Oct. 9, 1986, Ser. No. 916,839
Int. Cl.[4] E05F *1/00*
U.S. Cl. 49—445 **31 Claims**



1. A wood-clad metal window frame comprising:

(a) an elongated metal head section having an interior side edge portion, a wood facing member secured to and extending along said interior side edge portion, an exterior side edge portion, and lip and flange means extending along its length;

(b) an elongated metal sill section having an interior side edge portion, a wood facing member secured to and extending along said interior side edge portion of said sill section, an exterior side edge portion, and lip and flange means extending along its length;

(c) a pair of elongated metal jamb sections each having an interior side edge portion, a wood facing member secured to and extending along said interior side edge portion of said jamb section, an exterior side edge portion, and lip and flange means extending along its length; and

(d) means for intersecting said head, sill and jamb sections to thereby form an assembled essentially all- metal window frame insertable into a preformed window opening in a wall having an interior surface and an exterior surface, said assembled frame being dimensioned to extend essentially entirely through said preformed window opening when inserted thereinto and having an interior side and an exterior side, said lip and flange means defining in said assembled window frame;

(1) an integral J-channel extending completely around the exterior side periphery of said frame and adapted to peripherally inwardly receive and conceal a portion of an exterior siding material defining said exterior surface of said wall,

(2) an integral, outwardly projecting nailing and flashing flange extending around the exterior side periphery of said frame inwardly adjacent said integral J-channel, and

(3) an integral pair of jamb channels each defined by a spaced pair of vertically extending, peripherally inwardly projecting jamb flanges, each pair of said jamb flanges being adapted to releasably engage and retain a side edge portion of an elongated sash-supporting balance member capable of movably supporting a pair of wooden window sashes,

said wood facing members collectively defining in said essentially all-metal assembled window frame an interior wood border which provides said frame with an all-wood interior appearance, and inhibits inward and outward heat flow through said frame.

4,694,613

RELIEF GRINDING OF LAWN MOWER CYLINDRICAL BLADES

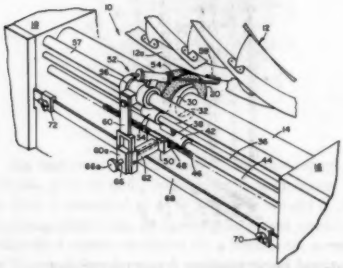
Stephen Bernhard, Rugby, England, assignor to Atterton and Ellis Limited, England

Filed Feb. 6, 1986, Ser. No. 826,606

Claims priority, application United Kingdom, Feb. 7, 1985, 8503151

Int. Cl.[4] B24B *7/00*

U.S. Cl. 51—34 C **4 Claims**



1. A grinding machine for relief grinding the blades of a lawn mower blade cylinder comprising:

housing means for supporting parts of the grinding machine;

a drive shaft rotatably supported by said housing means;

a grinding wheel mounted on said drive shaft for rotation therewith and for axial movement therealong;

separate first, second and third fixed shafts supported by said housing means;

a fork assembly comprising at least one fork arm for coupling said fork assembly to said grinding wheel and a first sleeve for carrying said fork assembly on said first fixed shaft, said first sleeve being axially movable along said first shaft;

traverse means for causing the axial traverse of said fork assembly and said grinding wheel coupled thereto, and for automatically reversing the direction of travel of said fork assembly so that said grinding wheel reciprocates along said drive shaft during rotation thereof;

a blade guide assembly comprising a guide finger, a guide element and, a second sleeve carrying said guide finger and guide element, said second sleeve being axially slidable along said second fixed shaft, and said guide finger being engagable with that face of a blade to be ground which is remote from said grinding wheel;

a third sleeve mounted for axial slidable movement on said third fixed shaft and being connected to said fork assembly for transmitting axial movement to said fork assembly from said traverse means; and

connecting means including locking means for releasably coupling both said blade guide assembly and said fork assembly with said traverse means so that said traverse means, said fork assembly and said blade guide assembly can traverse together whereby the back face of the blade to be ground is maintained in constant engagement with the grinding wheel.

4,694,614

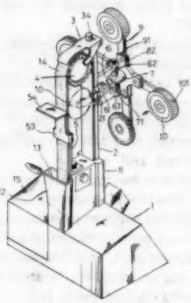
MULTIPURPOSE POLISHER

Yang C. Shyang, P.O. Box Taichung 2103, Taichung, Taiwan

Filed Aug. 21, 1986, Ser. No. 898,580

Int. Cl.[4] B24B *21/00*

U.S. Cl. 51—141 **3 Claims**



1. A multi-purpose polisher comprising:

a base having a stand and an openable cover,

a column vertically mounted on the base and having a fixing recess in an appropriate place and a fixing pin at the top end,

a pulley support fixed to the column with said fixing pin and having a wheel axle,

an upper pulley fitted on the said wheel axle,

an abrasive belt fitted in the column and on the upper pulley,

a work stand being in L shape and having a long slot in the vertical piece and a short slot in the horizontal piece,

a work table fixed to the said work stand and being adjustable in height with the slot,

a support plate fixed to the back of the column and having a magnet in the plate as high as the work stand, and an upper knuckle and a lower knuckle,

a swivelling shaft having a vertical pivot pin for connecting with the upper and lower knuckles of the support plate by means of ball and socket joints, and a stop block for making the shaft stop in an appropriate place,

a radial frame having a stub fitted in the swivelling shaft, and a plurality of arm supports extending radially from the hub,

a plurality of support arms having slots at one end for fixing with the arm supports, and axles perpendicular to an arm axis, mounting a plurality of supporting wheels having rims in different shapes or widths;

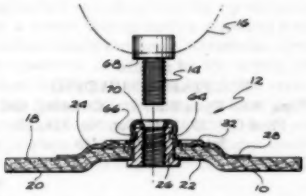
said swivelling shaft being so arranged that any one of the supporting wheels can be selectively placed behind the abrasive belt and changed to another one of said supporting wheels to meet various requirements of polishing.

4,694,615

DISPOSABLE DEPRESSED CENTER GRINDING WHEEL HAVING AN INTEGRAL MOUNTING HUB

Joseph H. MacKay, Jr., 17551 Cabela Dr., San Diego, Calif. 92127

Filed Apr. 3, 1986, Ser. No. 847,793
Int. Cl.[4] B24B *45/00*; B24D *13/20*
U.S. Cl. 51—168 **16 Claims**



1. A depressed center grinding wheel having a disposable drive member backing flange non-removably affixed thereto for mounting on a rotatable shaft of a power tool comprising:

a grinding wheel having a face and a back with a depressed center, said depressed center extending from said face toward said back, said depressed center having a first centrally disposed aperture therethrough;

a backing flange having a diameter smaller than the diameter of said grinding wheel and defining a second centrally disposed aperture therethrough, said backing flange seated on said back of said grinding wheel over said depressed center with said first and second apertures aligned;

a retaining nut having a hollow internally threaded body having first and second ends, a first radially outwardly extending flange extending from said first end of said body, said body extending through said first aperture from said face toward said back with said flange seated against said face; and

means including said second end of said body for non-removably securing said retaining nut and said backing flange to said wheel without the use of adhesives while permitting relative axial movement between said retaining nut and said backing flange toward each other to thereby compress said wheel between said backing flange and said flange on said nut as grinding loads are applied to said wheel during use thereof.

4,694,616

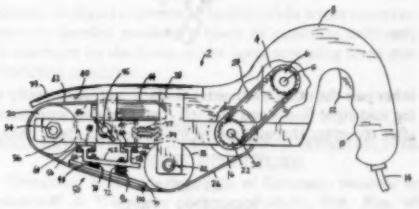
REMOVABLE BELT-BACKING MECHANISM FOR A BELT SANDER

Robert C. Lindberg, Rte. 2, Box 306R, Dorchester, Wis. 54425

Filed Jun. 25, 1986, Ser. No. 878,415
Int. Cl.[4] B24B *23/06*
U.S. Cl. 51—170 EB **21 Claims**

1. A removable belt-backing mechanism for attachment to a belt sander having at least two rollers and an endless loop sanding belt therearound for forming a sanding span therebetween, said belt having an outer sanding surface and an inner surface engaged by said rollers, said belt sander being provided with belt tensioning means for performing the dual function of maintaining tension in said belt both when said belt-backing mechanism is attached to said sander and when said belt-backing mechanism is removed from said sander, so that the same belt can be used on said sander for sanding flat surfaces when said belt-backing mechanism is in place on said sander and for sanding curved surfaces when said belt-backing mechanism is removed from said sander, said removable belt-backing mechansim comprising:

attachment means for removable mounting of said belt-backing mechanism on said sander within said loop of said belt,



said attachment means including a bearing surface spaced away from the connection of said attachment means to said sander and toward said belt, said attachment means being adapted for removable interconnection with a receiving means provided on said sander;

plate means having a substantially flat surface movably connected to said attachment means; and

biasing means bearing between said bearing surface of said attachment means and said plate means for biasing said plate means away from said attachment means and toward the inner surface of said belt, so that a substantially flat sanding area is maintained along the portion of said sanding span-backed by said plate means when pressure is applied to said sanding span.

4,694,617

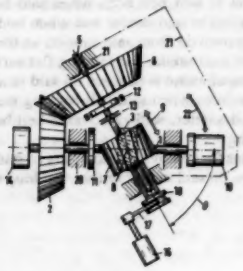
METHOD FOR THE PRECISION WORKING OF THE TOOTH SYSTEM OF BEVEL GEARS

Herbert Loos, Dorfen Stadt, and Manfred Erhardt, Puchheim, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen und Zahnradfabrik GmbH & Co., Munich, Fed. Rep. of Germany

Filed Feb. 21, 1986, Ser. No. 832,100
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1985, 3506499
Int. Cl.[4] B24B *19/00*
U.S. Cl. 51—287 **3 Claims**

1. In a method for the precision working of the tooth system of a bevel gear workpiece by moving during rolling contact with a bevel-gear-shaped tool with axes which are spaced and crossed at a defined location, said tool having abrasive flank surfaces free of any uniformly directed cutting edges and a sufficient axial dimension so that engagement with said workpiece occurs from one axially facing side of said workpiece tooth system to the other, the improvement comprising wherein a guidegear pair is provided, orienting the crossed axes for said workpiece and said tool so that the common normal to the axes, extending a direction parallel to a plunge feed direction, is oriented externally of the confines of said workpiece and said tool, orienting and connecting each guide gear coaxially to a respective one of said workpiece and tool, each guide gear being selected so as to have the same speed ratio as said workpiece-tool pair, bringing both said workpiece-tool pair and also said guide-gear pair into a rolling

meshing engagement with normal backlash provided therebetween, controlling said engagement so that in one pair in each case only the right or the left tooth sides contact, while in the



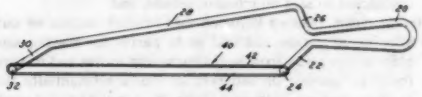
other pair the other tooth sides contact, and sequentially working said right flanks and said left flanks on said workpiece one after the other through means for effecting a flank change.

4,694,618

SANDING TOOL

Edward Eberhart, Northville, Mich., and Arlen E. Ingram, 32606 Barkley, Livonia, Mich. 48154, assignors to Arlen E. Ingram, Livonia, Mich.

Filed Mar. 31, 1986, Ser. No. 846,013
Int. Cl.[4] B24D *15/04*
U.S. Cl. 51—392 **3 Claims**



1. A manually operated sanding tool which comprises a support frame comprising a handle having embedded therein two proximal ends of a double run rod connected at the distal end by a bight portion, said runs being parallel and spaced apart in a plane, U-shaped loop supports having one leg provided with a right angle threaded extension to insert between and be clamped on said parallel runs, a threaded nut on each extension to clamp the supports to said parallel runs of said frame, and the other leg lying in spaced relation to said plane to provide longitudinally spaced loop supports, and a flat closed loop of abrasive material having each end of the loop respectively looped over said loop supports and retained in tension.

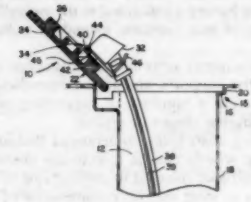
4,694,619

PIT COVER ASSEMBLY WITH FLOOD PROTECTION

Kathyleen A. Dabich, 7212 Patterson Dr., Garden Grove, Calif. 92640

Filed Apr. 8, 1986, Ser. No. 849,543
Int. Cl.[4] F16L *5/00*; E02D *29/14*
U.S. Cl. 52—20 **9 Claims**

1. In a sub-surface pit having a cover support, a cover having a top side and an underside hingedly mounted on said support above a hollow chamber and hingedly rotatable between raised and seated positions, the improvement comprising a hollow, concave cup formed of a rigid, water impervious material and having an open mouth and secured to said underside of said cover by means of a hinge mechanism and disposed so that said mouth faces downwardly when said cover is seated, whereby said cup is adapted to receive water sensitive equipment and to define an air pocket to protect said water sensitive equipment when water rises in said chamber to mouth of said cup, and said cup moves in rotation about said above the



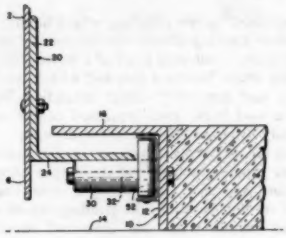
level of said hinge connection when said cover is moved between said raised and seated positions.

4,694,620

ROTATABLE BUILDING

Ralph E. Pope, 3680 Ryan Bluff Dr., Cumming, Ga. 30130

Filed Oct. 29, 1986, Ser. No. 924,269
Int. Cl.[4] E04B *1/346*
U.S. Cl. 52—65 **3 Claims**



1. A rotatable building comprising an annular vertical wall positioned above a fixed generally horizontal ground surface, and means for supporting the building for rotary movement and for prevention of binding when relative horizontal movement of the building and the ground surface occurs, comprising:

(a) a fixed annular member of right-angular cross sectional shape positioned within the lower part of the building wall and having a vertical flange with its free edge supported on the ground surface and a horizontal flange spaced above the ground surface and extending radially outwardly from the vertical flange with its free edge positioned inwardly of the inner surface of the building wall,

(b) a plurality of horizontal cylindrical rollers supported in an annular series and connected to the vertical flange of the annular member and extending radially outwardly therefrom toward and spaced from the inner surface of the building wall, and

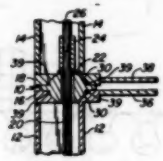
(c) an annular flat horizontal member extending radially inwardly from the building wall with its lower surface resting on and supported by the cylindrical surfaces of the rollers, with its inner edge spaced outwardly of the vertical flange of the fixed annular member.

4,694,621

MODULAR BUILDING CONNECTING MEANS

Reginald A. J. Locke, 184 Hooper St., San Francisco, Calif. 94107

Filed Nov. 7, 1984, Ser. No. 669,154
Int. Cl.[4] E04B 1/41
U.S. Cl. 52—79.13 15 Claims



1. A steel building construction for fastening structural members of a steel building together comprising:

a plurality of rigid, solid connectors, circular in section, each with an axial bore, a flat top surface and bottom surface perpendicular to the bore, a ring-shaped flange midway between the top surface and the bottom surface, a first sloping surface extending from the top surface toward the flange, a second sloping surface extending from the bottom surface toward the flange, wherein the circumference of the connector as defined by the sloping surfaces increases as the flange is approached, a first vertical surface extending from said first sloping surface to said flange and a second vertical surface extending from said second sloping surface to said flange, said flange having an axial dimension less than a distance from said top surface to said flange;

a plurality of rods with a threaded first end and a threaded second end, the first end of each rod passing through the bore in a connector;

a plurality of coupler nuts, each located proximate to a connector and having a threaded through bore for receiving the first end of one rod and the second end of another rod; and

a plurality of spaced structural members of a building, each structural member having a mating portion defining a recess within each of its ends shaped to couple with the portion of the connector extending outward from one of the surfaces of the flange, each said mating portion of said structural member having a sloped surface complementary to one of said connector sloped surfaces and a vertical surface joined to said mating portion sloped surface and complementary to one of said connector vertical surfaces and offset from said connector vertical surface such that a gap is defined so that said structural member sloped surface may slide along said connector sloped surface when subjected to a horizontal force, the structural members being aligned with each other, with a string of the rods extending through the structural members, coupler nuts and connectors.

4,694,622

CONCRETE STRUCTURAL ELEMENTS, PROCESS AND DEVICE FOR MANUFACTURING THESE ELEMENTS

Pierre Richard, Neuilly Sur Seine, France, assignor to Bouygues, Clamart, France

Filed Jul. 26, 1985, Ser. No. 759,446
Claims priority, application France, Jul. 27, 1984, 84 11988; Jul. 27, 1984, 84 11987
Int. Cl.[4] E04C 3/10
U.S. Cl. 52—223 R 14 Claims

1. A block of uniformly compressed concrete formed by the steps of:

surrounding an area of liquid concrete with a hoop of resiliently stretchable wires crossing each other and passing between each other,

compressing the liquid concrete to stretch the hoop, and

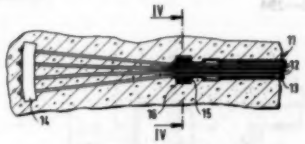
allowing the liquid concrete to harden while under compression to thereby produce a block of concrete uniformly compresses by the force of the hoop returning to its prestretched condition.

4,694,623

CLOSED RING-SHAPED REINFORCING MEMBER FOR A CONCRETE STRUCTURE

Gero Herrmann, Karlsfeld, Fed. Rep. of Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,867
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1984, 8437161
Int. Cl.[4] E04C 3/10, 5/12
U.S. Cl. 52—223 L 12 Claims



1. A closed axially extending ring-shaped reinforcing member to be embedded in and included within a concrete structure for laterally encircling at least one prestressing member, said reinforcing member being stressable by annular tension forces and preventing the transfer of such forces from said ring-shaped reinforcing member into the concrete in which said reinforcing member is embedded, said ring-shaped member is formed of steel and has a radially inner surface and a radially outer surface each extending in the general direction of the axis thereof and completely encircling the axis, and a coating of a material deformable under compression located on and completely covering the radially outer surface of said steel ring-shaped member whereby with said coating in surface contact with the concrete embedding the ring-shaped reinforcing member said coating deforms and prevents the transfer of annular tension forces to the concrete.

4,694,624

MODULAR PRE-INSULATED, PRE-FINISHED BUILDING BLOCK

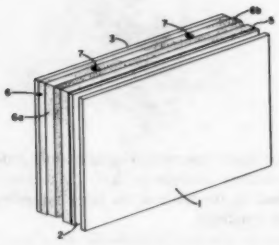
William M. Juhas, 2604 Ninth St., Cuyahoga Falls, Ohio 44221

Filed Jan. 21, 1986, Ser. No. 820,141
Int. Cl.[4] E04C 3/10
U.S. Cl. 52—228 14 Claims

1. A pre-insulated and pre-finished modular building block for a modular building system, said building block comprising:

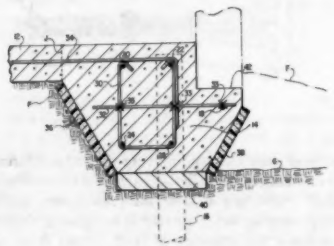
(a) a pair of spaced parallel structural elements;

(b) a one-piece rigid foam insulating element disposed between said structural elements;
(c) a vapor barrier between one of said structural elements and said insulating element;
(d) structural element retainer means attached to said structural elements for securing said structural elements in predetermined spaced relationship;



(e) at least one tubular conduit for a fastening rod, said conduit being secured to said retainer means and extending through said insulating element extending thereof from one edge to the opposite edge thereof; and
(f) a fastening rod extending through said conduit from one edge to the opposite edge of said building block.

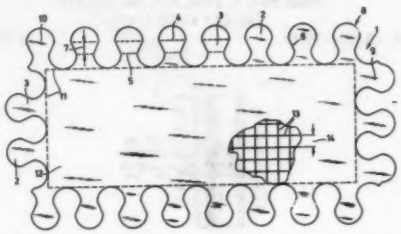
4,694,625
FOUNDATION FILING SYSTEM
Steven D. Gregory, 2400 S. Monte Viste, Adz, Okla. 74820
Filed Apr. 2, 1986, Ser. No. 847,278
Int. Cl.[4] E02D *27/00*
U.S. Cl. 52—294 **9 Claims**



1. A foundation system for a building, comprising a concrete slab constructed and arranged to form a foundation of said building, a concrete grade beam formed around said slab, a plurality of pipes extending along said grade beam, each pipe having a first portion extending into the ground and a second portion projecting from the ground and into said grade beam, and at least one horizontally extending bar member extending continuously around said grade beam and through an opening formed in each projecting portion of said pipes.

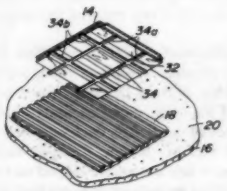
4,694,626
INSULATING BOARD
Hans Nicklas, Darmstadt, and Christoph Pruzina, Walluf, both of Fed. Rep. of Germany, assignors to ISPO Gmbh, Kritel, Fed. Rep. of Germany
Filed Jul. 18, 1986, Ser. No. 888,549
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985, 3526715
Int. Cl.[4] E04C *2/10, 2/26*
U.S. Cl. 52—309.12 **15 Claims**

1. An insulating board of plastic foam provided on at least one edge with beaver-tail-shaped tabs that completely complement similar tabs of another board when the boards are placed alongside one another, each beaver-tail-shaped tab being geometrically in the form of a trapezoidal area with, adjacent its



longer parallel side, an area demarcated by an axially symmetrical curve of the second order about 1.1 times as that side, the height of the trapezoidal area equalling at least ½ the thickness of the board.

4,694,627
RESILIENTLY-CUSHIONED ADHESIVELY-APPLIED FLOOR SYSTEM AND METHOD OF MAKING THE SAME
Ray E. Omholt, 1027 Valley Forge Rd. (#414), Devon, Pa. 19333
Filed May 28, 1985, Ser. No. 738,611
Int. Cl.[4] E04F *13/08*
U.S. Cl. 52—390 **45 Claims**



1. A resiliently-cushioned adhesively-applied floor system comprised of a plurality of floor panels secured to a support base by an elastomeric adhesive of trowelable consistency, the adhesive being spread on at leat one of the floor panels or the support base in spaced ridges of a generally uniform thickness, the floor panels being forced toward the support base so that the adhesive ridges form an intimate bond between the floor panels and the support base, the improvement comprising:

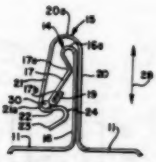
a plurality of spaced elongated support member means fabricated of a pre-cured elastomeric material, the support member means having a thickness less than the initial thickness of the uncured adhesive ridges, the support member means being positioned between the floor panels and the support base and being spaced from each other for providing both initial and permanent resilient cushioned support to the floor panels, the support member means engaging the floor panels, the support base and the adhesive when the floor panels are forced toward the support base, the spaces between the adhesive ridges, the adhesive and the support member means cooperating to provide cushioned resilient support for the floor panels.

4,694,628

METAL BUILDING PANEL WITH STANDING SEAM EDGE FORMATIONS

G. Earl Vondergoltz, Fulshear, and Milton E. Hammack, Houston, both of Tex., assignors to ECI Building Components, Inc., Stafford, Tex.

Filed Apr. 21, 1986, Ser. No. 854,097
Int. Cl.[4] E04D 1/18
U.S. Cl. 52—528 **11 Claims**



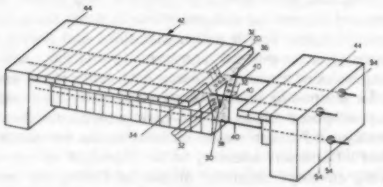
1. A metal building panel of the type adapted to form a standing seam joint between an adjoining pair of said panels, said panel having longitudinal edges shaped to define integral male and female edge formations, each of said edge formations having an upstanding flange extending generally perpendicular to the plane of the panel member, each of said upstanding flanges being joined by an intermediate arcuate portion with a return flange disposed adjacent common sides of the respective upstanding flanges, the return flange of said female edge formation being joined with a reentrant rib which extends toward said intermediate arcuate portions obliquely to said upstanding flanges, and into the space defined between the distal portion of the return flange of the male edge formation and the upstanding flange of the male edge formation, whereby the reentrant rib of the female edge formation will snap under the distal portion of the return flange of the male edge formation and into said space when male and female edge formations of an adjoining pair of said panels are interengaged by relative movement along a line generally perpendicular to the planar body portions of the such pair of panels, and a return lip joined with the reentrant rib of the female edge formation and adapted to engage and slide along the upstanding flange of the male edge formation upon the application of a squeezing force thereby to extend farther into said space for forming a locking interengagement between an adjoining pair of said panels.

4,694,629

MODULAR BLOCK AND MODULAR STRUCTURAL ELEMENTS CONSTRUCTED THEREFROM

Hossein Azimi, Box 1690, Rolla, Mo. 65401

Filed Aug. 16, 1985, Ser. No. 766,777
Int. Cl.[4] E04B 5/04
U.S. Cl. 52—611 **10 Claims**



1. A horizontally extending modular structural element constructed from a plurality of modular blocks, the element comprising:

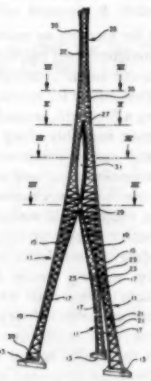
a plurality of modular blocks, each block having a generally hollow T-shaped cross-section, the block comprising a base section having opposite ends and comprising two oppositely extending colinear legs terminating respectively at said opposite ends and defining a flat generally horizontal top surface extending between said opposite ends; a stem section having outer sides spaced inwardly from said opposite ends and extending downwardly from the center of the bottom of the base section, the stem section having a compound configuration comprising a first portion having inner sides and upper sections of said outer sides tapering downwardly and inwardly from the base section, the stem section having a second portion below the first portion having generally vertical parallel lower sections of said outer sides; an axial hole defined at least in part by the inner sides extending through the first portion of the stem section; and, at least three axial passages for receiving tension members, the three passages being arranged in a triangular pattern around the axial hole, a side of this triangular pattern being parallel to the flat top surface of the block; the plurality of blocks being arranged in a line parallel to the three passages and of uniform cross section, the line of blocks having first and second ends with their axial passages aligned to define three triangularly oriented compound passages through the blocks extending from the first end to the second end for receiving tension members; a tension member extending through each compound passage in the blocks; and means for engaging the tension member to the block at each end of the line, the tension member exerting a compressive force on the blocks, holding the blocks together and putting the blocks under a compressive pre-stress.

4,694,630

TOWER AND METHOD OF CONSTRUCTING A TOWER

Henry J. McGinnis, 7241 Martha La., Fort Worth, Tex. 76111

Filed Feb. 3, 1986, Ser. No. 825,206
Int. Cl.[4] E04H 12/00
U.S. Cl. 52—649 **6 Claims**



1. A tower, comprising:

a base section and a window section extending upward from the top of the base section;

each section having a plurality of columns, each column having an outside leg and two inside legs, laced together in a triangular cross-section throughout the length of each section;

the width of each column in the window section varying along the length of the window section, from larger widths at the top and bottom of the window section to a minimum width area between the top and bottom of the window section;

the columns being spaced apart at the bottom of the base section, converging upward and joining each other at the top of the base section; and

the columns in the window section joining each other at the

bottom of the window section, separating from each other between the top and bottom of the window section, and joining again at the top of the window section, defining an open window between the columns in the window section.

4,694,631

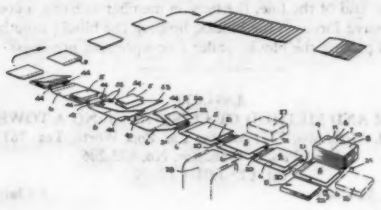
MECHANISM FOR FOLDING AN ENVELOPE AROUND AN INSERT

William H. Gunther, Jr., Mystic, Conn., assignor to Gunther International, Ltd., Mystic, Conn.

Continuation of Ser. No. 747,704, Jun. 24, 1985, abandoned, which is a continuation of Ser. No. 423,665, Sep. 27, 1982, abandoned. This application Jul. 31, 1986, Ser. No. 874,043

Int. Cl.[4] B65B *11/48, 57/00*

U.S. Cl. 53—55 19 Claims



1. A mechanism for forming an envelope comprising a stack of pre-cut single predetermined individual envelope assemblies and a stack of pre-cut single predetermined individual letter insert assemblies, first means for moving each individual envelope assembly along a first path, second means for moving each individual letter insert assembly along a second path, said first and second moving means comprising a pair of conveyor mechanisms superimposed over and in spaced relationship to each other, each conveyor mechanism being adapted to receive an assembly, each of said assemblies being individually fed to their respective conveyor mechanism from stacks of assemblies, code data on said letter insert assembly and said envelope assembly, reading means adjacent the stacks for sensing said code data to determine whether an insert assembly matches an envelope assembly before said assemblies are fed to their respective conveyor mechanisms and before the assemblies are fed from the stacks, means for comparing the code data sensed by the reading means to determine whether a predetermined letter insert assembly is matched with a predetermined envelope assembly whereby feeding from said stacks is interrupted if the code data on the predetermined letter insert assembly does not match with a predetermined envelope assembly, third and fourth means in line with said first and second moving means for receiving said assemblies from said first and second moving means and for causing said assemblies to move along superimposed third and fourth paths, said third means includes means for folding each letter insert assembly and for positioning each predetermined letter insert assembly in superimposed relationship to each predetermined envelope assembly, said fourth means includes means for causing said folded letter insert assembly to be deposited on top of said moving envelope assembly means for folding said envelope assembly around said letter insert assembly and means for sealing the edges of said envelope assembly.

4,694,632

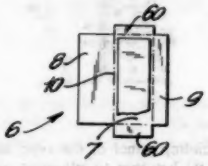
MECHANISM FOR FOLDING AN ENVELOPE AROUND AN INSERT

William H. Gunther, Jr., Mystic, Conn., assignor to Gunther International, Ltd., Mystic, Conn.

Continuation-in-part of Ser. No. 747,704, Jun. 24, 1985, abandoned, which is a continuation of Ser. No. 423,665, Sep. 27, 1982, abandoned. This application Aug. 25, 1986, Ser. No. 899,645

Int. Cl.[4] B65B *11/48*

U.S. Cl. 53—55 6 Claims



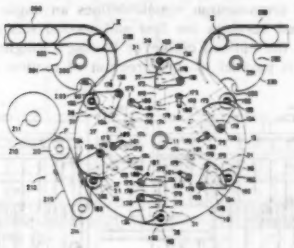
1. A mechanism for forming an envelope comprising a stack of pre-cut single predetermined individual envelope assemblies having a rear edge and a stack of pre-cut single predetermined individual letter insert assemblies having a rear edge, first means for moving each individual envelope assembly along a first path, second means for moving each individual letter insert assembly along a second path, said first and second moving means comprising a two-tiered conveyor mechanism with each tier superimposed over and in spaced relationship to each other, each tier of said conveyor mechanism being adapted to receive an assembly, means operatively associated with said first and second means to move both assemblies with their rear edges in vertical alignment with each other, each of said assemblies being individually fed to their respective conveyor mechanism tiers from stacks of assemblies 1 code data on said letter insert assembly and said envelope assembly, reading means adjacent the stacks for sensing said code data to determine whether an insert assembly matches an envelope assembly before said assemblies are fed to their respective conveyor mechanism tiers and before the assemblies are fed from the stacks, means for comparing the code data sensed by the reading means to determine whether a predetermined letter insert assembly is matched with a predetermined envelope assembly whereby feeding from said stacks is interrupted if the code data on the predetermined letter insert assembly does not match with a predetermined envelope assembly, third and fourth means in line with said first and second moving means for receiving said assemblies from said first and second moving means and for causing said assemblies to move along superimposed third and fourth paths, said third and fourth means comprising a two-tiered conveyor mechanism, said third means includes means for folding each letter insert assembly and for positioning each predetermined letter insert assembly in superimposed relationship to each predetermined envelope assembly, said fourth means includes means for causing said folded letter insert assembly to be deposited on top of said moving envelope assembly, means for folding the envelope assembly around said letter insert assembly, means for sealing the edges of said envelope assembly, said envelope assembly comprising a front panel, a rear panel, end flaps and a seal flap, said means for depositing deposits the folded letter insert assembly onto said front panel, and means operatively associated with said two-tiered conveyor mechanism for maintaining said folded letter insert assembly on said front panel during movement of both said assemblies.

4,694,633

FILM WRAPPING MACHINE

Masaaki Fujio, Suita, and Tetsuhiro Yamamoto, Hirakata, both of Japan, assignors to Fuji Seal Industry Co., Ltd., Osaka, Japan

Filed Nov. 10, 1986, Ser. No. 929,500
Claims priority, application Japan, May 21, 1985, 60-109982; May 20, 1986, 61-116565; May 20, 1986, 61-116566
Int. Cl.[4] B65B *21/26, 11/56*
U.S. Cl. 53—49 **5 Claims**



1. A film wrapping machine for successively turning films around articles so as to form a film tube encircling each article, which machine comprises:

a rotary turntable assembly supported for rotation in one direction about a support shaft, said rotary turntable assembly being, during one complete rotation, movable from and back to an article supply station past a film supply station and an article delivery station, all of said stations being disposed in the vicinity of the periphery of of the rotary turntable assembly;

a plurality of article supports provided in the rotary turntable assembly at a peripheral portion thereof for rotation together with said rotary turntable assembly about the support shaft, said article supports being spaced an equal distance from each other in a direction circumferentially of the rotary turntable assembly, each of said article support being operable to carry the respective article during the rotation of the rotary turntable assembly;

an article supply unit disposed at the article supply station for supplying the articles successively onto the respective article supports in the rotary turntable assembly as the rotary turntable assembly during the rotation thereof arrives at the article supply station;

a film retaining member provided for each article support and supported in the vicinity of the respective article support for rotation about an axis parallel to the support shaft between inoperative and operative positions and also for movement in a direction parallel to the support shaft between raised and lowered positions, said film retaining member having suction openings defined therein in at least two leading and trailing rows, the leading and trailing rows of the suction openings being spaced a predetermined distance from each other in a direction conforming to the direction of rotation of the film retaining member, said leading row of the suction openings being adapted to retain a leading end of the associated film by the effect of a suction force whereas the trailing row of the suction openings is adapted to retain a trailing end of such associated film by the effect of a suction force, said film retaining member being rotatable about the associated article on the article support from the inoperative position towards the operative position only when and after it has been moved from the lowered position towards the raised position;

a film supply unit disposed at the film supply station for supplying the film onto the respective film retaining member each time the rotary turntable assembly is brought to the film supply station, said film retaining member being moved from the lowered position to the raised position upon the arrival of the rotary turntable assembly at the film supply station such that the leading end of the film can be sucked by the leading row of the suction openings by the effect of the suction force, the film with its leading end sucked by the leading row of the suction openings being exteriorly turned around the associated article as the film retaining member is rotated from the inoperative position towards the operative position, said film being completely turned around the associated article with a portion of the film adjacent the trailing end sucked by the trailing row of the suction openings permitting the trailing end to overlap the leading end;

a heater unit provided for each article support and carried by the rotary turntable assembly for movement between projected and retracted positions in a direction close towards and away from the associated article on the article support, said respective heater unit being moved from the retracted position to the projected position in unison with the movement of the associated film retaining member from the inoperative position to the operative position, said heater unit when moved to the projected position being pressed against the associated film retaining member with the overlapping ends of the film around the article consequently fusion-bonded together to complete a film tube; and

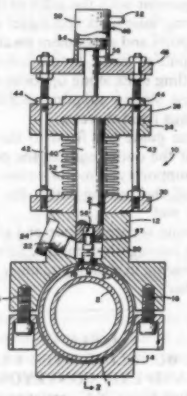
an article delivery unit disposed at the article delivery station for removing the articles with the respective film tube successively out from the associated article supports as the rotary turntable assembly during its continued rotation is brought to the article delivery station.

4,694,634

VACUUM SEALING DEVICE FOR INSULATED STEAM INJECTION TUBING

Paul T. Anderson; Lawrence Irwin; John C. Matthews, all of Lancaster, and Charles E. Paugh, Canal Winchester, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Sep. 16, 1985, Ser. No. 776,254
Int. Cl.[4] B65B *1/00*
U.S. Cl. 53—88 **8 Claims**



1. A vacuum sealing device for plugging a port in a tube comprising:

clamping means adapted to engage around a tube and over a port to be plugged in the tube, said clamping means having a space with an opening;

a vacuum connector connected to said clamping means and communicating with said space for drawing a vacuum from said space;

a sealing pin movable in said space between a first position

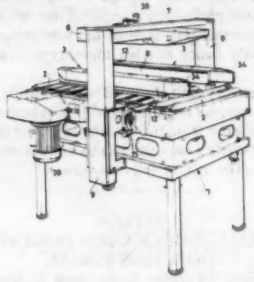
spaced away from said opening and a second position extending into said opening, said sealing pin having a plug portion and a shank portion with a breakable tab connected between said plug portion and shank portion; and drive means for driving said sealing pin from its first position to its second position whereby said plug portion can be sealed into a port of a tube engaged by said clamping means, and for breaking said tab to separate said plug portion from said shank portion.

4,694,635

MACHINE FOR SEALING CARDBOARD BOXES OF CONSTANT WIDTH

Augusto Marchetti, Piazza Sicilia, 7, 20146 Milano, Italy

Filed Dec. 9, 1985, Ser. No. 807,018
Claims priority, application Italy, Dec. 17, 1984, 24084 A/84
Int. Cl.[4] B65B *7/16*
U.S. Cl. 53—137 **4 Claims**



1. A machine for sealing cardboard boxes of constant width, comprising:

a support table for the boxes;

a pair of belt pulling units placed at an adjustable distance along opposite sides of the support table to achieve a pulling engagement with the sides of the boxes, said pulling units having inlet ends and outlet ends;

first sliding supports and adjustment means, fitted at the inlet ends of the pulling units, for adjusting the distance between the pulling units along opposite sides of the support table, said first sliding supports including a plurality of sliding bushings fixed thereto;

a first transverse guide bar fixed to the support table and arranged near the outlet ends of the pulling units;

second sliding supports and motorization means, fitted at the outlet ends of the pulling units, for operating the belt pulling units; and

forked plates being secured at one end to the second sliding supports and having shoe means, formed at an opposite end, for embracing in a sliding manner with the first transverse guide bar.

4,694,636

HORIZONTAL BUNDLING WITH VARIABLE ENTRY AND EXIT CONVEYORS

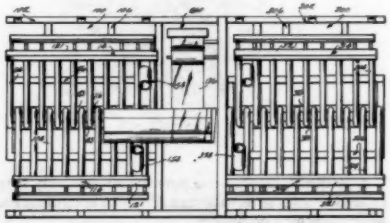
Everett Griffin, High Point, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Mar. 23, 1981, Ser. No. 246,437
Int. Cl.[4] B65B *13/12*
U.S. Cl. 53—399 **16 Claims**

1. An apparatus for wrapping articles comprising:

(a) an infeed conveyor having an infeed support frame and first and second sets of rotatably driven infeed rollers which intersect to form a conveyor having a "V" shaped cross-section which defines an angle A that is measured between the first and second sets of infeed rollers, the infeed conveyor having a longitudinal axis which is parallel to the direction of motion of aritcles along the infeed conveyor, the angle A having a bisecting plane which intersects the longitudinal axis, the first set of infeed rollers being retained in a first infeed support frame and the second set of infeed rollers being retained in a second infeed roller frame which has a side that is pivoted in the infeed support frame at a pivot point;

(b) an outfeed conveyor having an outfeed support frame and first and second sets of rotatably driven outfeed rollers which intersect to form a conveyor having a "V" shaped cross-section which defines an angle B that is measured between the first and second sets of outfeed rollers, the outfeed conveyor having a longitudinal axis which is parallel to the direction of motion of articles



along the outfeed conveyor, the angle B having a bisecting plane which intersects the longitudinal axis of the outfeed conveyor, the first set of infeed rollers being retained in a first outfeed roller frame which has a side that is pivoted in the outfeed support frame and a second outfeed roller frame which has a side that is pivoted in the outfeed support frame at a pivot point;

(c) means disposed between the infeed and outfeed conveyors for wrapping articles with a sheet of material to form a package having a plurality of sides while the articles are conveyed between the infeed and outfeed conveyors; and

(d) means for varying the angular orientation of the bisector plane of the angle A with respect to the bisector plane of the angle B so that the package is oriented on a predicted side when it leaves the outfeed conveyor.

4,694,637

METHOD AND APPARATUS FOR GROUPING, ORIENTING, AND PACKING ARTICLES

Marcus C. Bech, Hillerod, and Ole Koster, Roskilde, both of Denmark, assignors to Stormax International A/S, Herley, Denmark

Filed Oct. 17, 1985, Ser. No. 788,311
Claims priority, application Denmark, Oct. 17, 1984, 4965/84
Int. Cl.[4] B65B *5/08, 35/38, 35/56*
U.S. Cl. 53—448 **11 Claims**

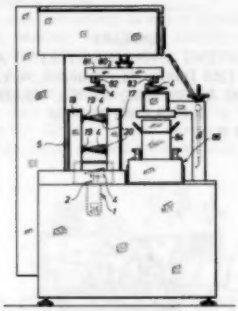
1. A method of grouping, orienting and packing articles having a cross section perpendicular to a longitudinal direction, the area of said cross section substantially decreasing towards one end of the article, seen in the longitudinal direction, and whereby the articles are advanced in rows on conveyor means, and subsequently grouped and oriented so as finally to be grouped in groups by a gripping device positioning the articles in an open packing box by means of gripping means gripping their respective articles, comprising the steps of

(a) advancing said articles (**4**) in a first advancing direction (**3**) while they are lying directly on a first endless and continuously operating conveyor (**1**);

(b) receiving said articles (**4**) in groups on a second endless and continuously operating conveyor (**5**); and

(c) moving said articles (**4**) in a second advancing direction (**45**) extending substantially parallel to the moving direc-

tion of said gripping means (82, 83) of said gripping device (80) during a gripping phase of their working cycle, said second conveyor (5) adjusting the mutual spacing of said



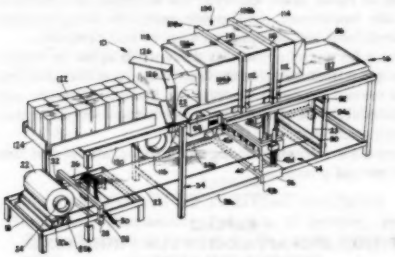
articles to the mutual spacing of said gripping means before the latter grip the articles (4) from said second conveyor (5).

4,694,638

APPARATUS AND METHOD OF LOADING ARTICLES INTO AN INFLATED BAG FROM A WEB

Forrest E. Maddux, Jr.; Paul A. Eagle, both of Cincinnati, and Robert L. Robbins, Covington, all of Ohio, assignors to The Ultra Bagger Co. of Cincinnati, Cincinnati, Ohio

Filed Aug. 28, 1986, Ser. No. 900,993
Int. Cl.[4] B65B *43/26*
U.S. Cl. 53—459 13 Claims



1. An apparatus for loading articles into an inflated bag from a web having at least two perforated sheets comprising:

(a) web supply means for receiving the web, the web supply means having sensor means for detecting perforations in the web;

(b) sheet separating means for separating an upper sheet of the web along a perforation, the sheet separating means being actuated by the sensor means, the sheet separating means comprising:

(i) a plurality of finger assemblies pivotally mounted on a support plate and biased away from the web;

(ii) cylinder means connected to the support plate for forcing the support plate in the direction of the web; and

(iii) control means connected to the sensor for actuating the cylinder means so that the finger assemblies contact the web at desired intervals to separate the first sheet along a perforation; and

(c) conveyor means for driving the web along its feed path, the conveyor means comprising a blower means for inflating a bag on the web after its first sheet has been separated by the sheet separating means and enclosure means for stabilizing the inflated bag on the conveyor means. assemblies contact the web at desired intervals to separate the first sheet along a perforation.

10. A method for loading articles into a bag formed from a web delineated by perforations, the web having at least first and second perforated sheets, comprising:

(a) detecting perforations on the web by a sensor means;

(b) providing a sheet separating means comprising:

(i) a plurality of finger assemblies pivotally mounted on a support plate and biased away from the web;

(ii) cylinder means connected to the support plate for forcing the support plate in the direction of the web; and

(iii) control means connected to the sensor for actuating the cylinder means so that the finger assemblies contact the web at desired intervals to separate the first sheet along a perforation;

(c) separating the first sheet along the perforation by actuating the cylinder means to force the plurality of finger assemblies against the web;

(d) advancing the web to a platform;

(e) blowing an air stream at the separating first sheet of the web so that a bag is inflated;

(f) stabilizing the inflated bag on the platform; and

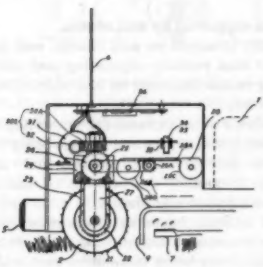
(g) advancing the articles into the inflated bag.

4,694,639

ROBOTIC LAWN MOWER

Sheng K. Chen; Shi Y. Horng, and I-Ting Chen, all of No. 17, Lane 32, Ta Chyuan Street, Taichung, Taiwan

Filed Dec. 30, 1985, Ser. No. 814,480
Int. Cl.[4] A01D *35/00, 53/08;* G05B *1/00*
U.S. Cl. 56—10.2 9 Claims



1. A lawnmower, comprising:

a power unit;

a drive wheel operatively coupled to said power unit for propelling said lawn mower;

a lead wheel for guiding said lawnmower to move along a route of travel, said lead wheel being rotatably mounted on a fork member which is rotatably attached to said lawnmower;

a control unit including a memory unit for storing said route of travel, said memory unit including a paper tape to be advanced in proportion with the rotation of said lead wheel and a writing device for recording said route of travel on said paper tape, said writing device having an arm member operatively connected to said fork member, said control unit also including a reading unit for reading said route of travel recorded in said memory unit and producing control signals according to said route of travel, and a control circuit for producing operation signals; and

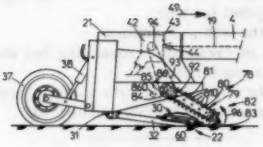
a steering unit operable by said operational signals for steering said lead wheel to guide said lawnmower to travel along said route of travel.

4,694,640

MOWING MACHINE FOR CUTTING HAY AND CEREAL GRASS

Rino Ermacora, Ottersthal, and Patrice Jehl, Imbsheim, both of France, assignors to Kuhn S.A., Saverne, France

Continuation of Ser. No. 716,178, Mar. 26, 1985, abandoned. This application Feb. 13, 1987, Ser. No. 15,561
Claims priority, application France, Nov. 12, 1984, 84 17351
Int. Cl.[4] A01D *34/66*
U.S. Cl. 56—16.4 **84 Claims**



1. A mowing machine comprising in combination:
a chassis,
cutting means supported by said chassis,
an intermediate structure on said chassis, said intermediate structure at least partially supporting said cutting means, said cutting means extending on both sides of said intermediate structure,
supporting wheels on said chassis for supporting said chassis on the ground, said supporting wheels being mounted on said chassis in a pivotable manner, and maneuvering means able to modify the position of said supporting wheels in relation to said chassis,
a beam fixed on said chassis by means of an upwardly directed axis to connect said mowing machine to a pulling vehicle, said beam being pivotable about said upwardly directed axis, so as to occupy different positions in relation to said chassis,
driving means to drive the cutting means, and
means associated with said intermediate structure for preventing attachment of crop to said intermediate structure.

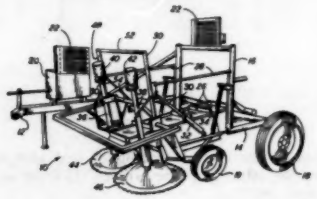
43. A mowing machine comprising in combination:
a chassis,
cutting means supported by said chassis,
supplementary working member supported by said chassis,
an intermediary structure on said chassis, said intermediate structure at least partially supporting said cutting means and/or said supplementary working members, said cutting means and/or said supplementary working members extending on both sides of said intermediate structure,
supporting wheels on said chassis for supporting said chassis on the ground, said supporting wheels being mounted on said chassis in a pivotable manner, and maneuvering means able to modify the position of said supporting wheels in relation to said chassis,
a beam fixed on said chassis by means of an upwardly directed axis to connect said mowing machine to a pulling vehicle, said beam being pivotable about said upwardly directed axis, so as to occupy different positions in relation to said chassis,
driving means to drive the cutting means and/or the supplementary working members, and
means associated with said intermediate structure for preventing attachment of crop to said intermediate structure.

4,694,641

CROP HARVESTING AND SOIL TILLING APPARATUS

John R. Porter, 1255 Dublin Rd., Waterloo, N.Y. 13165

Filed Jul. 29, 1985, Ser. No. 759,958
Int. Cl.[4] A01D *46/00*
U.S. Cl. 56—328 R **10 Claims**



1. In an agricultural implement of the type having forward and rear ends, a rigid frame mounted upon wheels for movement through a field and a pair of circular disks mounted upon power-driven drive shafts at the forward end for rotation about parallel, substantially vertical axes which are evenly spaced on opposite sides of the longitudinal centerline of the implement, the improvement comprising:
(a) at least two elongated, substantially horizontal guide members rigidly affixed to the forward end of the implement frame and extending forwardly and outwardly therefrom at equal, acute angles to the longitudinal centerline of the implement, said guide members being equally spaced from and on opposite sides of said centerline;
(b) means for mounting the disk drive shafts upon the respective guide members for movement thereon between first and second positions wherein the distance between said rotational axes is changed between first and second values, respectively; and
(c) means for releasably fixing said drive shafts in said first and second positions.

4,694,642

METHOD AND APPARATUS FOR PRODUCING REINFORCED THREAD

Gennady V. Zhigalov; Abdurakhim Abduganiev; Sergei Y. Kim, and Robert R. Mosheev, all of Tashkent, U.S.S.R., assignors to Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin, Tashkent, U.S.S.R.

Filed Dec. 12, 1986, Ser. No. 940,809
Int. Cl.[4] D01H *7/882;* **D02G** *3/36*
U.S. Cl. 57—5 **2 Claims**

1. A method of producing reinforced thread by winding fibres around a core thread in a ringless open-end spinning process, using a twisting member, including:
supplying a stream of loose fibres onto the flat surface of the disc of a rotating twisting member, said twisting member having an axis of rotation;
guiding a core thread through said disc of said twisting member eccentrically with respect of said axis of rotation of said twisting member, to form by rotation of said twisting member two balloons of said core thread with their respective apexes disposed to the opposite sides of said disc;
aligning said respective apexes of said balloons with said axis of rotation of said twisting member;
rotating said twisting member to wind said fibres around said core thread, for forming the reinforced thread.

2. An apparatus for producing reinforced thread by winding fibres around a core thread in an open-end ringless spinning process, comprising:

a guide for the core thread;

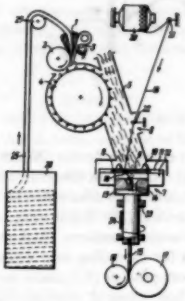
fibre-separating means;

a twisting member having an axis of rotation; a body of said twisting member; and blades radially arranged on said body of said twisting member;

a fibre-guiding duct;

said twisting member communicating through said fibre-guiding duct with said fibre-separating means;

said guide for the core thread having a geometric centre, said centre being aligned with said axis of rotation;



a flat disc of said twisting member; an axial bore in said flat disc; means on said flat disc for retaining fibres thereon; radially extending slits made through said discs for the passage of a stream of air created by said blades radially arranged on the surface of said flat disc, facing said body of said twisting member;

an opening for the passage of the core thread made in said disc eccentrically with respect to said axis of rotation of said twisting member;

a holder for a bobbin with the supply of said core thread; a unit for winding the reinforced thread;

said guide of said core thread overlying the plane of said flat disc.

4,694,643

SPINNING OR TWISTING MACHINE

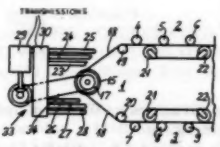
Horst Wolf, Albershausen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 819,541

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1985, 3901530

Int. Cl.[4] D01H *1/20, 1/24, 1/241, 1/28*

U.S. Cl. 57—100 **16 Claims**



1. In a machine for spinning or twisting yarn with at least two kinds of working units, each of which is connected with a drive mechanism having at least one motor, wherein on interruption of the energy supply the rotational speed of each of said drive mechanisms run down together with said rotational speed of the remaining ones of said drive mechanisms from a normal operational value of said rotational speed, the improvement wherein said drive mechanisms have a common synchronizing means, and are connected with each other operably by at least one torque transfer device independent of said synchronizing means.

4,694,644

METHOD AND APPARATUS FOR PRODUCING OVAL CHAIN LINKS FROM ROUND WIRE

Willi Rudy, Iserlohn, and Gerhard Lange, Reutlingen, both of Fed. Rep. of Germany, assignors to Wafios Maschinenfabrik GmbH & Co. KG, Fed. Rep. of Germany

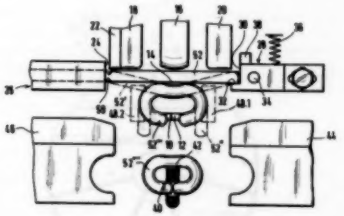
Filed Nov. 8, 1985, Ser. No. 796,214

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1984, 3440907

The portion of the term of this patent subsequent to Jul. 21, 2004, has been disclaimed.

Int. Cl.[4] B21L *1/02*

U.S. Cl. 59—27 **7 Claims**

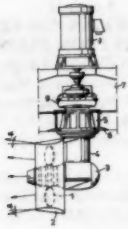


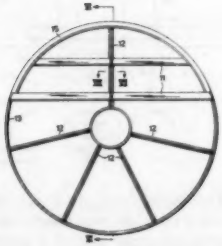
1. In a method for the manufacture of oval chain links out of round wire, in which a straight wire length which perpendicularly crosses the longitudinal axis of a cylindrical bending mandrel having an annular groove surroundin this axis in a vertical plane to receive the wire length, is fed toward the mandrel in line with the groove but laterally spaced therefrom; in which the center of the length which forms the back of the link is moved into a recess in the mandrel on the feed side thereof and in line with the groove therein; in which the recess forms two points which are adjacent the groove base and which most closely approach the longitudinal axis of the feed of the wire length and in which the wire length separated from the wire is bent into the groove outside of the mandrel recess until the longitudinal axis of the wire length follows the course of the groove, the improvement comprising the steps of initially bending the wire length against the mandrel groove in a first bending station into the shape of an obtuse V; preventing the trailing end of the wire length and its leading free end from significantly moving perpendicularly relative to the longitudinal and feed direction of the straight wire length during the initial bending of the wire length and the simultaneous moving of the center thereof into the mandrel recess; maintaining during a prebending including the initial bending of a straight wire length, into a C-shaped wire piece which is closed in a second bending station for the final bending of the wire piece into an O-shape, in the first bending station a perpendicular spacing of the straight wire length from the two adjacent points of the groove base amounting to at least the diameter of the wire; and transporting, at the latest the next wire length during the transport of the preceding wire length to the second bending station to the position adjacent the mandrel of the first bending station after the prebending of the preceding wire piece into the C-shape.

4,694,645
PROPELLER ASSEMBLY

Nils O. Flyborg, and Orvar Björheden, both of Kristinehamn, Sweden, assignors to Kamewa AB, Kristinehamn, Sweden

Filed May 21, 1985, Ser. No. 736,533
Claims priority, application Sweden, May 23, 1984, 8402792
Int. Cl.[4] B63H *11/00*; F04D *7/00*; B03H *1/16*
U.S. Cl. 60—221 6 Claims





1. A propulsion and steering apparatus which controls the direction of a propeller jet for mounting underneath the bottom part of a hull of a watercraft, comprising:

a propeller and a fixed propeller shroud embracing the propeller;

a propeller shaft on which said propeller is mounted;

a gear housing in which said propeller shaft is journalled and which accommodates a bevel gearing through which the propeller shaft is connected to a drive shaft extending perpendicular to said propeller shaft;

a tubular support strut surrounding said drive shaft and having a lower end connected to said gear housing for supporting said gear housing and an upper end adapted to be rotatably mounted in an opening in said bottom part of the hull of the watercraft with the axis of rotation of the support strut extending vertically and the propeller shaft extending in a substantially horizontal direction;

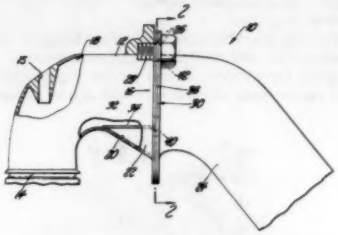
said propeller shroud being provided at its outlet end with stationary, substantially horizontally extending guide vanes positioned obliquely in relation to the direction of the propeller shaft so as to deflect a propeller jet generated and exiting from the propeller shroud upon rotation of the propeller obliquely downwardly in relation to the direction of the propeller shaft;

wherein the propeller shroud is provided at its outlet end also with stationary, substantially radial guide vanes for eliminating rotational movement in the propeller jet.

4,694,646
EXHAUST PORT EQUALIZER DEVICE

Robert P. Holmstrom, 30427 Nye, Livonia, Mich. 48484

Filed Jun. 9, 1986, Ser. No. 871,787
Int. Cl.[4] F01N *3/00*
U.S. Cl. 60—272 9 Claims

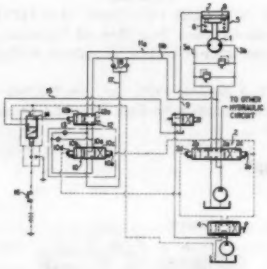


1. An exhaust port equalizer device (30) for insertion into an exhaust port-passage (12) of an internal combustion engine having an exhaust header (24) connected to the exhaust port-passage (12), said device (30) comprising: an integral sheet metal body of substantially uniform thickness having a flow control portion (32) for extending into and defining one side portion (18) of the port-passage (12), and a support portion (36) connected to said flow control portion (32) for removable attachment between the exhaust header (24) and the port-passage (12) to smooth the gas flow between the exhaust port-passage (12) and the exhaust header (24), said flow control portion (32) being substantially flat and projecting at an angle from said support portion (36).

4,694,647
HYDRAULIC CIRCUIT SYSTEM FOR USE IN HYDRAULICALLY OPERATED VEHICLES

Kazuhiro Yoshida, Hirakata, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,294
Int. Cl.[4] F16D *31/02*
U.S. Cl. 60—442 4 Claims



1. A hydraulic circuit system for use in hydraulically operated vehicles, comprising:

(a) a forwardly and reversely rotatable slewing motor having a brake unit associated therewith and hydraulic fluid circuits for rotating said slewing motor forwardly and reversely;

(b) a directional control valve for connecting and disconnecting said fluid circuits with and from a pressurized fluid supply source, said control valve having an OFF position and forward and reverse rotating positions and being remotely controlled by a pilot fluid pressure;

(c) bypass circuits, one ends of which are respectively connected to said fluid circuits;

(d) a shadow valve having a communicating position for allowing said bypass circuits to communicate with each other at their respective other ends and disconnecting positions for disconnecting said bypass circuits from each other, said shadow valve being interlocked with said directional control valve to enable interlocked control to be achieved in such a manner that it may assume its communicating position when said directional control valve is located at its OFF position, while it may assume its disconnecting positions when said directional control valve is located at either forward or reverse rotating position, and

(e) an ON-OFF changeover valve provided in said bypass circuits for allowing said bypass circuits to communicate with and disconnect from said shadow valve.

4,694,648

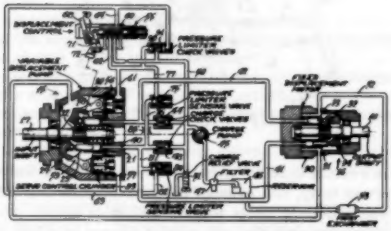
ANTI-PLUG CONTROL

Richard Beck, Jr., Ames, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Continuation of Ser. No. 449,407, Dec. 13, 1982, abandoned. This application Mar. 20, 1985, Ser. No. 714,091

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—452 **9 Claims**



1. An anti-plug control in combination with a drive for a driven working element to prevent jamming of the driven working element in response to an overload wherein said drive includes a fluid motor and a variable displacement fluid pump for supplying fluid to the motor comprising, servo means including a servo control cylinder for controlling displacement of the pump, means for sensing the pressure of the fluid delivered by the pump to the motor, means responsive to an increase of said pressure beyond a predetermined value for modifying the displacement of said pump to increase the speed of said drive, and means operable in response to an increase in the fluid pressure a predetermined amount beyond said predetermined value for modifying the displacement of the pump to decrease the speed of the drive.

4,694,649

PRESSURE LIMITING ACCELERATION CONTROL SYSTEM AND VALVE FOR HYDRAULIC MOTORS

David F. Howeth, 233 Chuck Wagon Trail, Fort Worth, Tex. 76108

Continuation of Ser. No. 463,739, Feb. 4, 1983, abandoned. This application May 2, 1986, Ser. No. 861,646

Int. Cl.[4] F16D *31/02*; F16K *31/12*

U.S. Cl. 60—468 **15 Claims**

1. In a hydraulic system including a pump and hydraulic motor means adapted to be supplied with pressure fluid by said pump through a flow circuit interconnecting said pump and said motor means, means for limiting the peak pressure imposed on said motor means in response to introducing full load fluid flow through said circuit to drive said motor means, said pressure limiting means comprising:

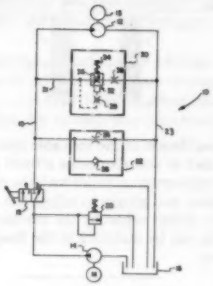
a self-closing valve adapted for progressive throttling of fluid flow through said circuit between said pump and said motor means in response to a predetermined pressure condition of fluid flowing through said valve, said valve comprising:

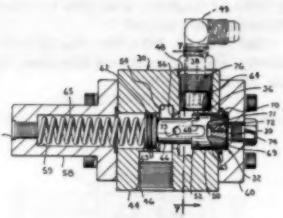
a body including a bore for receiving a closure member and a surface defining valve seat means, a fluid inlet port and a fluid discharge port opening into said bore;

a cylindrical closure member disposed in said bore including a portion cooperable with said seat means for throttling fluid flow through said valve, said closure member having an end surface;

biasing means for urging said closure member toward a valve open position;

means in said valve for predetermining a pressure condition in said valve resulting from introduction of full load fluid





flow to said motor means for urging said valve to close against said biasing means;

a pilot pressure fluid actuator including passage means extending through said end surface of said closure member and in communication with fluid flowing through said valve at a point upstream of said seat means for conducting pressure fluid to said pilot actuator, said pilot pressure fluid actuator further including a pilot pressure fluid chamber, defined in part by said end surface of said closure member, for receiving pressure fluid from said passage means; and

orifice means in said passage means for limiting the rate of fluid flow to said pilot actuator to cause said closure member to progressively throttle the flow of fluid through said valve.

4,694,650

EXTERNALLY TUNED VIBRATION ABSORBER

Ronald J. Vincent, Latham, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

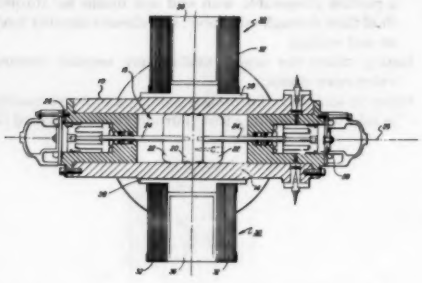
Filed Jul. 28, 1986, Ser. No. 889,697

Int. Cl.[4] F02G *1/04*

U.S. Cl. 60—520 **21 Claims**

1. In a hydraulic apparatus of the type having a housing

filled with a relatively incompressible fluid, said housing being secured to a prime mover and containing diaphragm means for converting vibratory energy transmitted from the prime mover into pressure waves within the fluid for oscillating a movable element along a linear path of motion, the improvement comprising at least one vibratory absorber unit attached to the outside of the housing for absorbing vibrational energy resulting from the oscillation of the movable element that includes a spring means and an absorber mass affixed to the spring means for reciprocal movement parallel with the path of travel of said movable element, and means to adjust the resonant frequency of the absorber means whereby the resonant frequency of the absorber means can be matched to the frequency range of the pressure waves.



4,694,651

BRAKE MASTER CYLINDER

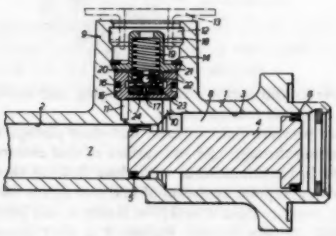
Alfred Yardley, Kidderminster, and John F. Pickering, Warwickshire, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Mar. 25, 1981, Ser. No. 247,619

Claims priority, application United Kingdom, Apr. 29, 1980, 8014024; Jun. 24, 1980, 8020621

Int. Cl.[4] B60T *11/08*

U.S. Cl. 60—578 **7 Claims**



1. A master cylinder of the quick-fill type comprising a body, a bore in the body stepped to define respective bore portions, a piston received in the bore and having opposite ends slidable in said respective portions of the bore, the piston defining in the bore a low volume pressure chamber and a larger volume quick-fill chamber, a port in the body open to the quick-fill chamber and a compensation port in the body for communication with the pressure chamber, a reservoir, means connecting the reservoir to said ports and including valve means for controlling communication between the reservoir and the ports, said valve means including a pressure responsive valve arranged to open when the pressure in the quick-fill chamber reaches a predetermined level and a one-way valve permitting free flow of fluid in the direction from the reservoir to the quick-fill chamber, and wherein the pressure responsive valve comprises a valve member and seat having annular, co-operating confronting substantially parallel surfaces, the seat having an opening at the center of the annular surface thereof communicating with said ports, and said confronting surfaces moving apart when the valve opens to allow fluid to flow therebetween in a direction substantially parallel to the said surfaces, and a groove is provided in one of said confronting surfaces and extends along a substantially spiral path, said groove defining a flow restricting by-pass passage between said confronting surfaces when said pressure responsive valve is closed.

4,694,652

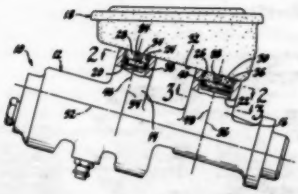
MASTER CYLINDER WITH RESERVOIR MOUNTING ARRANGEMENT

John R. Coleman, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 16, 1986, Ser. No. 852,826

Int. Cl.[4] B60T *11/26;* **F15B** *7/08, 7/10*

U.S. Cl. 60—585 **7 Claims**



7. In a master cylinder assembly having a cylinder body and a reservoir body, said cylinder body having first and second reservoir mounting bores formed therein in axially parallel spaced relation with the axes thereof located in a first plane passing through said cylinder body, and said reservoir body having first and second mounting bayonet members extending therefrom in axially parallel spaced relation and respectively received in said cylinder body mounting bores in mounted sealing relation to deliver brake fluid between the interior of said reservoir body and the interior of said cylinder body, said bayonet members having basic diameters established by worst case tolerancing in said first plane involving both of said reservoir mounting bores and said mounting bayonet members, the improvement comprising:

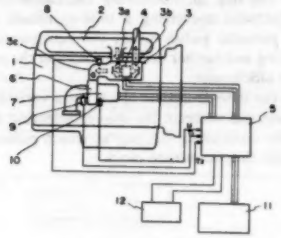
said first and second mounting bayonet members each having a pair of diametrically opposed axially extending ribs formed thereon with rib axes respectively parallel to the axes of said first and second mounting bayonet members and respectively located in second and third planes respectively passing through the axes of said first and second mounting bayonet members and substantially perpendicular to said first plane, the diameter of said first mounting bayonet member in said second plane through and including said ribs on said first mounting bayonet member being greater than the basic diameter of said first mounting bayonet member and being established by worst case tolerancing in said second plane involving only said first reservoir mounting bore and said first mounting bayonet member, and the diameter of said second mounting bayonet member in said third plane through and including said ribs on said second mounting bayonet member being greater than the basic diameter of said second mounting bayonet member and being established by worst case tolerancing in said third plane involving only said second reservoir mounting bore and said second mounting bayonet member.

4,694,653

ENGINE ENERGY RECOVERY APPARATUS

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,760
Claims priority, application Japan, Oct. 29, 1985, 60-241871
Int. Cl.[4] F01D *15/10*; F02G *5/00*
U.S. Cl. 60—597 4 Claims



1. A apparatus for recovering exhaust energy from an exhaust turbine rotated by exhaust gas produced in an engine, comprising:

(a) an exhaust turbine provided at an exhaust port of the engine;

(b) a generator rotated by said exhaust turbine;

(c) a first temperature sensor for sensing exhaust temperature at an inlet of said exhaust turbine;

(d) a second temperature sensor for sensing exhaust temperature at an outlet of said exhaust turbine;

(e) a speed sensor for sensing rotational speed of said exhaust turbine;

(f) first means for determining exhaust turbine efficiency based on signals from said first and second temperature sensors and said speed sensor; and

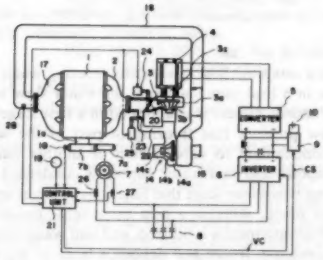
(g) second means for adjusting a load on said generator so as to maximize the exhaust turbine efficiency determined by said first means.

4,694,654

EXHAUST ENERGY RECOVERY AND GENERATOR FOR USE WITH AN ENGINE

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Oct. 29, 1984, Ser. No. 666,058
Claims priority, application Japan, Oct. 29, 1983, 58-203238; Oct. 31, 1983, 58-204569; Mar. 17, 1984, 59-51558
Int. Cl.[4] F02B *37/00*
U.S. Cl. 60—605 8 Claims



1. An exhaust energy recovery and generator device for a thermally insulative engine having an exhaust passage and an output shaft, the device comprising:

(a) a first exhaust turbine disposed in the exhaust passage of the thermally insulative engine and rotatable by the energy of an exhaust gas discharged from the thermally insulative engine, said first exhaust turbine having a wheel and a wheel shaft;

(b) a generator having a rotor shaft coupled coaxially with the wheel shaft of said first exhaust turbine;

(c) a converter operatively connected to said generator for converting alternating current into direct current;

(d) an inverter operatively connected to said converter for converting direct current into alternating current;

(e) a motor having a rotatable shaft and drivable by said generator via said converter and said inverter;

(f) means connecting the rotatable shaft of said motor to the output shaft of the thermally insulative engine, whereby the energy of the exhaust gas recovered by said first exhaust turbine can be fed back to the output shaft of the thermally insulative engine through said generator, said converter, said inverter and said motor;

(g) a body of silicon steel fitted over the rotor shaft of the generator; and

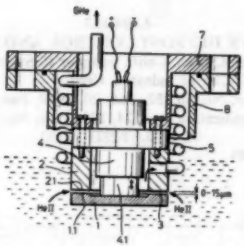
(h) a stator coil, having a winding, for passing an armature current which is 90° advanced in phase through the winding to generate a no-load induced electromotive force, said generator thereby serving as a reluctance generator.

4,694,655

CONTROLLABLE HELIUM-II PHASE SEPARATOR

Albert Seidel, Siegertsbrunn, and Werner Malburg, Neubiberg, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 12, 1986, Ser. No. 895,802
Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530168
Int. Cl.[4] F17C *13/02*
U.S. Cl. 62—51 5 Claims



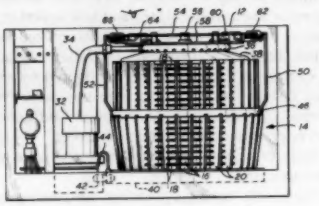
1. A controllable helium-II phase separator comprising suport means, control means coupled to said support means and at least one capillary gap-shaped canal in communication with a source of superfluid helium-II, said superfluid helium-II flowing in said at least one capillary gap-shaped canal utilizing the cut-off action of the thermomechanical effect, the geometry of said capillary gap-shaped canal being varied by said control means, whereby the gap width of said at least one canal can be changed by varying the distance between two opposite canal walls at least in the range between 0 and 15 μm, said opposite canal walls being formed by surfaces facing each other of at least one cylindrical ring element and at least one disc element, said control means coupled to at least one of the disc element or the ring element in an axial direction of the disc element and ring element.

4,694,656

ROTARY RELEASE ICE MACHINE AND METHOD

Robert C. Lane, and Joseph M. Lee, both of 2030 Richmond, Houston, Tex. 77098

Filed Feb. 7, 1986, Ser. No. 827,083
The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.
Int. Cl.[4] F25C 1/12
U.S. Cl. 62—72 22 Claims



18. An article of manufacture suitable for making ice blocks including a vertically disposed plurality of ice freezing pockets with each pocket of said freezing pockets comprising in combination:

(a) a directly refrigeratable freezing member forming the base of each pocket;

(b) at least two vertically disposed apart and horizontally extending fins attached with each freezing member and forming the sides of said pocket;

(c) at least two horizontally pivotable and vertically disposed plates mounted contiguously with said freezing member and said extending fins to form the ends of each said pocket of said plurality of pockets;

(d) said freezing member being of cylindrical shape with said fins extending around said freezing member and with said vertically disposed plates being pivotally mounted in spaced apart relation around said freezer for pivoted horizontal movement; and

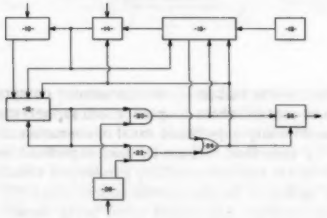
(e) each of said vertically disposed plates being pivoted on centers located away from its inner edge.

4,694,657

ADAPTIVE DEFROST CONTROL AND METHOD

Eldon D. Vaughn, Brea, Calif., assignor to Spectrol Electronics Corporation, City of Industry, Calif.

Division of Ser. No. 50,352, Jun. 20, 1979, Pat. No. 4,680,940. This application Apr. 24, 1986, Ser. No. 855,267
Int. Cl.[4] F25D 21/00
U.S. Cl. 62—80 6 Claims



1. A method of determining the appropriate time-to-initiate a defrost cycle for effecting a change in operation of a refrigeration circuit to remove frost from a heat exchanger forming a part of the refrigeration circuit comprising the steps of

detecting the period of elapsed time during the previous defrost cycle,

selecting a time period for which the refrigeration circuit should be operated between defrost cycles based upon the elapsed time during the previous defrost cycle,

monitoring the cumulative operating time of the refrigeration circuit between defrost cycles,

comparing the cumulative operating time of the refrigeration circuit with the time period formulated by the step of selecting to ascertain the appropriate time-to-initiate the next defrost cycle, said appropriate time occuring when the cumulative operating time equals the preselected time,

wherein the step of monitoring the cumulative operating time includes energizing a time-to-initiate clock which emits periodic pulses when the refrigeration circuit is operating and further includes counting the pulses emitted by the clock; and

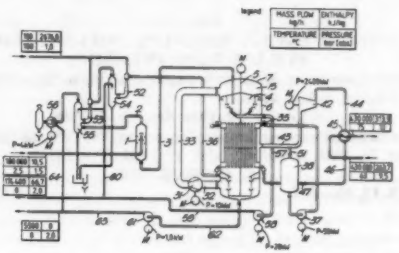
wherein the time-to-initiate clock has a variable pulse emission rate and wherein the step of selecting a time period includes controlling the rate at which pulses are emitted from the time-to-initiate clock.

4,694,658

METHOD AND EQUIPMENT FOR UTILIZATION OF THE FREEZING HEAT OF WATER AS A SOURCE OF HEAT OF A HEAT PUMP

Pentti Juhola, Espoo, Finland, assignor to Rintekno Oy, Espoo, Finland

PCT No. PCT/FI84/00086, § 371 Date Jul. 19, 1985, § 102(e) Date Jul. 19, 1985, PCT Pub. No. WO85/02458, PCT Pub. Date Jun. 6, 1985
PCT Filed Nov. 26, 1984, Ser. No. 762,192
Claims priority, application Finland, Nov. 25, 1983, 834335
Int. Cl.[4] F25B 19/00
U.S. Cl. 62—100 17 Claims



1. Method for using the heat released by freezing water as a source of heat in a heat pump wherein the water flow to be utilized as the source of heat is evaporated in a first stage at a sufficiently low pressure that freezing of part of the water occurs as a concomitant to vaporization of another part ot yield water vapour, and said water vapour is condensed in a heat exchanging condenser stage that functions as the evaporator of the heat pump, wherein a heat exchanging condenser stage of plural compartments is utilized, and said water vapour is caused to condense, freeze and deposit a layer of ice in at least one but not all of said compartments of said condenser stage while delivering heat of solidification to a heat transfer medium for the heat pump, and concurrently in at least some of the condenser stage compartments in which ice is not then being deposited melting ice previously formed therein, and alternating the use of said compartments.

4,694,659

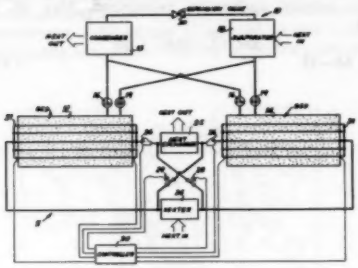
DUAL BED HEAT PUMP

Samuel V. Shelton, 1183 Burnt Creek Ct., Decatur, Ga. 30033

Continuation-in-part of Ser. No. 729,921, May 3, 1985, Pat. No. 4,610,148. This application Sep. 8, 1986, Ser. No. 904,673

Int. Cl.[4] F25B *17/00, 17/08*

U.S. Cl. 62—106 **17 Claims**



1. A method of operating a heat pump system including a heat pump loop and a heating loop where the heat pump loop includes a pair of solid adsorbent beds connected to a condenser and an evaporator with an expansion device therebetween so that refrigerant flows from the bed being heated to the condenser while the refrigerant can flow from the evaporator to the bed being cooled, and where the heating loop includes a heat exchanger associated with each bed design so that when a heat transfer fluid is flowing therethrough, a thermal temperature gradient or wave will be generated along the bed together with a cooling heat exchanger between one of the ends of the beds and a heating means between the other ends of the beds comprising the steps of:

circulating the heat transfer fluid around the heating loop until the exit temperature of the heat transfer fluid passing out of either of the beds shifts from the initial temperature of that bed by at least about twenty percent (20%) of the difference between the initial bed temperature and inlet fluid temperature; and

then reversing the flow of the heat transfer fluid around the heating loop each time the exit temperature of the heat transfer fluid passing out of either of the beds shifts from the initial temperature of that bed by at least about twenty percent (20%) of the difference between the initial bed temperature and inlet fluid temperature.

4,694,660

REFRIGERATION SYSTEM INCLUDING CAPACITY MODULATION

Edwin L. Gannaway, Adrian, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed May 27, 1986, Ser. No. 867,802

Int. Cl.[4] F25B *41/00*

U.S. Cl. 62—196.4 **26 Claims**

1. A refrigeration system including capacity modulation comprising:

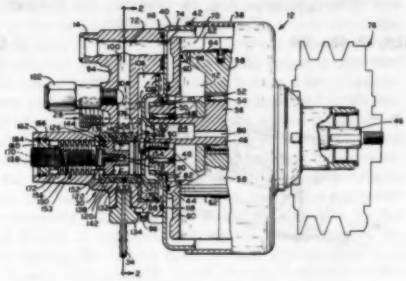
a compressor having a suction chamber and a discharge side,

a condenser having an inlet side connected to the discharge side of the compressor and an outlet side,

an evaporator connected between the outlet side of the condenser and the suction side of the compressor,

a liquid bypass conduit means connected between the outlet side of the condenser and the suction chamber of the compressor for bypassing a portion of the liquid refrigerant from the condenser around the evaporator to the compressor suction chamber, and

pressure responsive valve means on said compressor having an inlet connected to said bypass conduit means and an outlet opening into said suction chamber, said valve means opening and closing in response to the pressure in said suction chamber for metering bypassed liquid refrigerant into said suction chamber to thereby vary the cooling



capacity of the compressor, wherein said valve means outlet opens directly into said suction chamber whereby the bypassed liquid refrigerant can expand immediately upon discharge from said valve means.

4,694,661

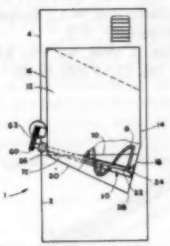
ICE DISPENSER WITH AN UPWARDLY INCLINED CHANNELED RAMP AND TWO PART AUGER

Jerry L. Landers, Sellersburg, Ind., assignor to Servend International, Inc., Jeffersonville, Ind.

Filed Jan. 23, 1986, Ser. No. 823,925

Int. Cl.[4] F25C *5/18*

U.S. Cl. 62—344 **25 Claims**



5. An ice storage bin in an ice dispenser has a rear wall, a front wall, and side walls which are connected to the rear and front walls and a cover means which rests atop the rear, front and side walls and a bottom wall extending between the rear wall, front wall and side walls, the bottom wall curving downward from relatively high positions on the side walls to relatively low positions intermediate the side walls and sloping upwardly from the rear wall to the front wall and a dispensing opening in the bin for dispensing ice stored within the bin, wherein the bottom wall has a central section with a relatively large radius of curvature near the rear wall and a relatively small radius of curvature near the front wall, and wherein the bottom wall has lateral portions with generally uniform radii of curvature which extend from the central section to the side walls and which slope upward from the rear wall to the front wall.

4,694,662

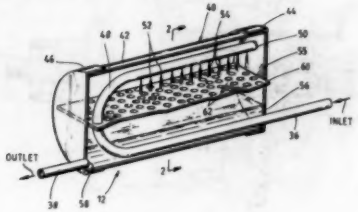
CONDENSING SUB-COOLER FOR REFRIGERATION SYSTEMS

Robert W. Adams, P.O. Box 68, Norway, Mich. 49870

Continuation of Ser. No. 665,916, Oct. 29, 1984, abandoned. This application Aug. 26, 1986, Ser. No. 901,962

Int. Cl.[4] F25B *39/04*

U.S. Cl. 62—509 **12 Claims**



1. A closed circuit, liquid refrigeration system comprising:
a liquid metering device for reducing the pressure of a liquid refrigerant;
an evaporator;
a compressor;
a condenser; and
a mechanical sub-cooler adjacent said metering device for condensing any vapor in said liquid refrigerant prior to said liquid refrigerant entering into said metering device, said sub-cooler consisting essentially of:
a shell defining a chamber having an inlet and an outlet; and
pressure reducing means connected to said inlet within said shell for receiving high pressure liquid refrigerant and reducing the pressure of liquid refrigerant passing therethrough.

4,694,663

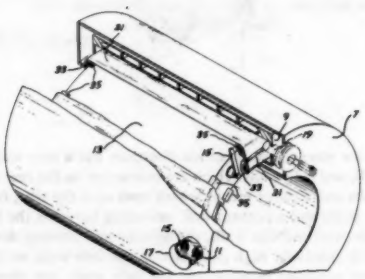
LOW COST INTERMEDIATE RADIATION SHIELD FOR A MAGNET CRYOSTAT

Russell S. Miller, Ballston Spa, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 3, 1986, Ser. No. 816,086

Int. Cl.[4] F25B *19/00*

U.S. Cl. 62—514 R **4 Claims**



1. A radiation shield assembly for a cryostat having an inner helium vessel, said cryostat defining a penetration for cooling the helium vessel, said radiation shield assembly comprising:
a flexible shield including means for conducting heat toward the cryostat penetration and providing an isothermal surface, the shield surrounding said helium vessel;
spacer means situated between said shield and said helium vessel; and
clamping means for holding said flexible shield under tension around said spacer means to prevent said flexible shield from sagging.

4,694,664

EAR ORNAMENTATION

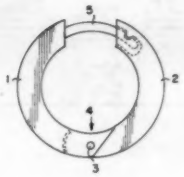
Carl Elsener, Uetlibergstrasse 60, CH-8902 Urdorf, Switzerland

Filed May 9, 1985, Ser. No. 732,514

Claims priority, application Switzerland, May 10, 1984, 2291/84

Int. Cl.[4] A44C *7/00*

U.S. Cl. 63—12 **9 Claims**



1. An ear ornamentation for wearing on and removable from a perforated ear lobe comprising two ornamental components (1, 2), (11, 12) of substantially the same size and configuration linked by means of a hinge (4) at one end and having engageable fastening means (5, 6, 7 and 8) at the other end of each said ornamental component (1, 2), (11, 12), and opposite each other relative to the direction of rotation about said hinge (4), said engageable fastening means comprising a spring pin (5) mounted in one said ornamental component (1, 11) with a transverse recess (6) near a terminal end of said spring pin (5), and a receiving aperture (7) with a projection (8) therein in the other said ornamental component, said projection (8) providing a snap catch for engagement with said transverse recess (6) in said spring pin (5), whereby said two ornamental components (1, 2), (11, 12) are positively and integrally locked by engagement of said fastening means upon rotation of said ornamental components in one direction, and said two ornamental components are opened and said fastening means disengaged by rotation of said ornamental components in an opposite direction, and said engageable fastening means are invisible when said ear ornamentation is engaged on said perforated ear lobe.

4,694,665

COUNTERFLOW WASHING MACHINE

Karl-Heinz Stoll, Wiesbaden, Fed. Rep. of Germany, assignor to Senkingwerk GmbH, Hildesheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 819,135, Jan. 15, 1986, Pat. No. 4,616,372, which is a division of Ser. No. 672,582, Nov. 16, 1984, Pat. No. 4,607,509. This application Jul. 1, 1986, Ser. No. 880,891

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1983, 3341504

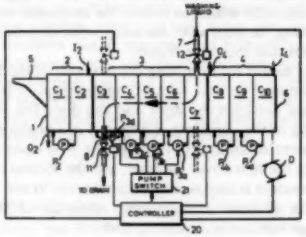
Int. Cl.[4] D06F *31/00*

U.S. Cl. 68—27 **5 Claims**

1. A washing machine, comprising:
a washing drum axially subdivided into a plurality of washing zones, each divided into a plurality of washing compartments, said drum being provided with means for transferring batches of wash through said zones and said compartments in one direction and in succession, and for agitating said batches in said compartments;
first flow-control means communicating with said drum for introducing a first washing liquid to a relatively upstream compartment of at least one of said zones and for draining said first washing liquid from said drum at a relatively downstream compartment of said one of said zones, whereby said first washing liquid flows from said rela-

tively upstream compartment to said relatively downstream compartment in said direction and contacts said batches in said relatively upstream compartment, said relatively downstream compartment and compartments of said one of said zones between said relatively upstream compartment and said relatively downstream compartment;

second flow-control means communicating with said drum for introducing a second washing liquid to said relatively downstream compartment of said one of said zones and for draining said second washing liquid from said drum at



said relatively upstream compartment of said one of said zones, whereby said second washing liquid flows from said relatively downstream compartment to said relatively upstream compartment in counterflow to said direction and contacts said batches in said relatively upstream compartment, said relatively downstream compartment and compartments of said one of said zones between said relatively upstream compartment and said relatively downstream compartment; and

means for contacting said batches with other liquids in others of said zones and said compartments.

4,694,666

SHACKLE MECHANISMS

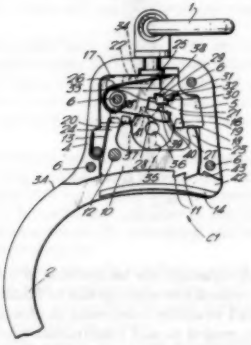
Ronald S. Bellingham, Bilston, and Malcolm J. White, Lichfield, both of England, assignors to Chubb & Son's Lock and Safe Company Limited, Feltham, England

Filed Nov. 21, 1985, Ser. No. 800,622

Claims priority, application United Kingdom, Dec. 13, 1984, 8431516

Int. Cl.[4] E05B *75/00*

U.S. Cl. 70—16 **2 Claims**



1. The combination of a shackle device an a correct key therefor, the shackle device comprising a pair of arms pivoted together at one of their respective ends and interengageable at their other respective ends so as collectively to encircle part of a subject's body; a first said arm being formed with a series of ratchet teeth on its convex side at its end remote from the aforesaid pivot and the second said arm extending from a casing which houses a resiliently-biased pawl for engagement with said teeth; the aforesaid ratchet teeth and pawl being so arranged as to permit continuous 360° rotation of the first arm relative to the second arm in the direction which closes the aperture defined by said arms but to prevent rotation of the first arm relative to the second arm in the opposite direction when the ratchet teeth and pawl are in contact; a key-engageable runner slidably borne in said casing and adapted to lift said pawl out of contact with said ratchet teeth against the action of said resilient bias when said runner is slid from a predetermined first position to a predetermined second position by the rotation of the correct key within said casing in a predetermined direction; the runner further having a manually-engageable portion extending outside of said casing for actuation by the finger or thumb of a person applying the shackle device for manually sliding the runner from its said first position to a predetermined third position, in the direction opposite to the direction of its movement from its first to its second position, in which third position a portion of the runner overlies a portion of the pawl to block the pawl from lifting out of contact with the ratchet teeth; a plurality of pivoted, key-engageable locking levers housed in said casing and biased to respective locking positions; each said lever having a first formation with which an abutment portion of the runner engages when the runner is in its said first position and the levers are in their locking positions, so as to block the movement of the runner from its said first position to its said second position, but said levers being pivotable to respective unlocking positions in which each said formation disengages from said abutment portion so as to permit such movement of the runner, by the rotation of the correct key within said casing in its said direction; each said lever having a second formation with which said abutment portion of the runner engages when the runner is in its said third position and the levers are in their locking positions, so as to block movement of the runner from its third to its first position, but each said second formation being arranged to disengage from said abutment portion so as to permit such movement of the runner when the levers are pivoted to their unlocking positions by the rotation of the correct key within said casing in its said direction; and at least one of said first formation of each lever and said abutment portion of the runner having a face inclined to the direction of movement of the runner from its first to its third position whereby movement of the runner in that direction by manipulation of said manually-engageable portion cams the levers away from their locking positions until the runner reaches its third position, whence the levers return to their locking positions under their aforesaid bias to engage their aforesaid second formations with the abutment portion.

4,694,667

PERMANENT PADLOCK-CHAIN ASSEMBLY

Allan M. Hodge, 5852 Lomond Dr., San Diego, Calif. 92120

Filed Jul. 26, 1985, Ser. No. 759,408

Int. Cl.[4] E05B *67/06;* A43C *11/08;* A44B *13/00;* F16G *15/00*

U.S. Cl. 70—49 **8 Claims**

1. An assembly for securing a chain to a padlock and for precluding separation of the chain and padlock, comprising:

a pair of sheet metal brackets each being bent to provide a pair of upstanding ears and a pair outwardly extending arms, with the two outwardly extending arms overlying one-another;

said outwardly extending arms having opposite facing notches defining a means for receiving and securing a link of a chain in said notches;

means for rigidly securing and locking said two brackets together in the area where the arms overlap one-another to permanently secure the chain to said brackets; and

said ears having aligned spaced hole means extending through said ears for receiving the pivot shank portion of

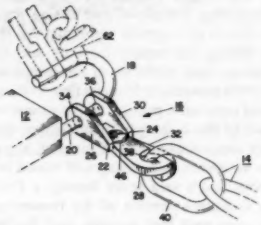
the padlock, said holes in said brackets being of a relatively small diameter to closely fit around the pivot shank of a padlock and being fixedly spaced apart by said locking means by a sufficiently great distance to preclude removal over the bent portion of said shank;

whereby, when said brackets are first assembled with the pivot shank portion of said padlock and a link of said chain located in said notches, and the brackets are then locked together, a permanent assembly is formed with the chain secured to said padlock even when the padlock is unlocked.

7. A permanent padlock and chain assembly, comprising:

a conventional padlock having a shackle having a curved portion and a straight pivot shank;

a chain;



first and second heavy sheet metal members each having an apertured first portion mounted with the aperture closely fitting over said straight pivot shank, and having a second portion displaced in orientation relative to said first portion, with the second portion of both of said sheet metal members overlying one-another;

means for permanently and rigidly locking the overlapping portions of said first and second members together with said apertured first portions being fixedly spaced apart from one-another to prevent removal of said two members from said shackle even when said padlock is open; and

means including opposite facing notches in said overlapping portions defining a means for locking onto one link of said chain when said two members are secured together.

4,694,668

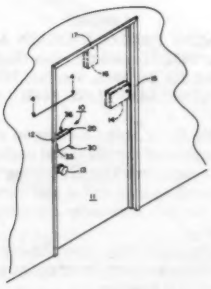
SECURITY BOX

Guy D. Ciletti, and Michael J. Trudeau, both of 7 Princeton, Irvine, Calif. 92720

Filed Oct. 24, 1986, Ser. No. 920,393

Int. Cl.[4] E05B *65/52*

U.S. Cl. 70—63 **11 Claims**



1. A device in which to place an article to be retrieved later by an intended recipient, comprising:

a container having a first portion defining a first opening through which to insert an article into the container, a second portion defining a second opening through which to retrieve the article from the container, and a size and shape enabling the container to be mounted on a conventional door;

a first cover member adapted to be locked in place on the container in a position disposed over the first opening, to limit access through the first opening;

support means, including a bracket member having a first end, a second end, and a generally flat midportion disposed intermediate the first and second ends that is shaped and dimensioned to fit between the door and a door frame on which the door is mounted, for providing a support structure with which to mount the container on the door by closing the door with the midportion disposed between the door and the door frame;

mounting means for attaching the first end of the bracket to the container so that with the midportion of the bracket disposed between the door and the door frame, the first opening of the container is disposed in a position enabling placement of an article through the first opening by unlocking the first cover member, and the second opening of the container is disposed closely adjacent to and facing the door in a position inhibiting retrieval of the article through the second opening; and

door engaging means, including a lip portion of the bracket member disposed intermediate the midportion of the bracket and the second end, for engaging the door to inhibit removal of the container when the door is closed while enabling removal when the door is open, to thereby enable an intended recipient to retrieve an article by opening the door and moving the container to a position providing access through the second opening.

4,694,669

DOOR LOCK STRUCTURE

Horst Schwalb, Ontario, Canada, assignor to Dynaflair Corporation Canada Inc., Pointe Claire, Canada

Filed Jul. 14, 1986, Ser. No. 885,546

Int. Cl.[4] E05B *65/08;* E05C *1/02*

U.S. Cl. 70—100 **12 Claims**

1. A door lock structure for securement in a longitudinal cavity in a door vertical free edge portion or folding door edge post, said door lock structure comprising an elongated locking rod supportingly guided in said longitudinal cavity, said rod having a locking free end movable above an open end of said bore above a horizontal edge of said door, said rod being normally biased in a retracted position in said cavity with said rod locking free end disposed inwardly of said horizontal door edge, external rod displacement means on an outside face of

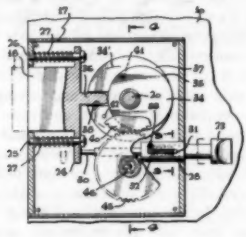
said door vertical free edge portion and secured to said rod for displacing said rod and said locking free end outwardly of said horizontal door edge to a locking position, bolt engaging means disposed inwardly of said door edge adjacent said rod for engaging said rod when placed in its locking position, key operated cam means accessible from an outside face of said door vertical free edge portion for disengaging said rod engaging means from engagement with rod, there being two of said longitudinal cavities axially aligned in said door edge, a locking rod associated with each said cavity and each biased with their respective locking free end inwardly of a top and bottom horizontal edge of said door, said bolt engaging means engaging both said bolts simultaneously in their locking position and permitting either of said bolts to be independently displaced to their locking position, each said bolt being provided with at least one retention notch therein, said bolt engaging means being an elongated lock arm having an arresting finger at opposed ends thereof, said lock arm being spring biased in the direction of said bolts with said arresting fingers contacting an associated one of said bolts whereby said fingers will enter said retention notch when displaced thereagainst.

4,694,670

COMBINED KEY AND COMBINATION LOCK

Young H. Jang, San Francisco Calle 72, Casa 38, Panama City, Panama

Filed Dec. 31, 1984, Ser. No. 687,938
Int. Cl.[4] E05B *37/08*
U.S. Cl. 70—303 R **1 Claim**



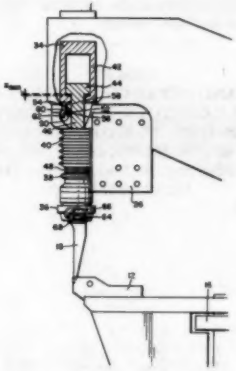
1. A combined key and combination lock comprising:
a key lock mechanism;
a combination rotary lock mechanism coaxially disposed with respect to said key lock mechanism;
a door mounted action bolt operable between a locked position and an unlocked position;
latch mechanism operated by cooperation of both said key lock mechanism and said combination rotary lock mechanism;
means interconnecting said key lock mechanism and said combination rotary lock mechanism whereby coded and selective operation of said key lock and combination rotary lock mechanisms operate said action bolt between said locked and unlocked positions via said latch mechanism;
means included in said interconnecting means for selectively disengaging said key lock mechanism and said combination rotary lock mechanism from one another so that said rotary lock mechanism operates to the exclusion of said key lock mechanism for unlocking said action bolt from said locked position;
overriding means operably coupled to said key lock mechanism and said combination rotary lock mechanism to maintain said action bolt in said locked position until released manually by a user;
said overriding means, including a manually operated push rod yieldably biased against said action bolt and further including retention means carried on said push rod in said locked position;
said interconnecting means includes a plurality of spaced apart discs, each disc having a cutout adapted to be linearly aligned to insertably receive said action bolt establishing said unlocked position and adapted to be non-linearly aligned establishing said locked position;
said interconnecting means further includes an eccentric drive cam adjacent said plurality of discs and said action bolt resiliently bearing against said drive cam to constitute a cam follower so as to move said action bolt out of said linearly aligned cutouts of said plurality of discs in response to rotation of said drive cam;
resilient means coupled to said action bolt for returning or normal biasing said action bolt into said disc aligned linear cutouts.

4,694,671

PRESS INCORPORATING SAFTEY SYSTEM

David Downham, Flitwick, England, assignor to Leslie Hartridge Limited, Buckingham, England

Continuation of Ser. No. 728,949, Apr. 30, 1985, abandoned. This application Oct. 17, 1986, Ser. No. 922,839
Claims priority, application United Kingdom, May 3, 1984, 8411336
Int. Cl.[4] B23Q *11/00*
U.S. Cl. 72—26 **10 Claims**



1. A press comprising:
(a) a frame;
(b) two press parts which are mounted on said frame in such a manner that one of the two parts is moveable towards the other part;
(c) drive means mounted on said frame and connected to said one of the two parts to effect such movement;
(d) a detector switch positioned on one of said two press parts, or a member connected thereto, and arranged to be operated by a resistance to such movement;
(e) a limit switch connected to said drive means and arranged to be operated by means of the motion of said one of the two press parts, or a member connected thereto, when the remaining available travel of said one of the two press parts in a direction towards said other press part is less than the thickness of an operator's finger
(f) control means connected to said drive means and having a first electrical input which, when an electrical signal is applied thereto, stops such movement, and a second electrical input which, when an electrical signal is applied thereto, enables a working force to be applied to said one of the two parts by the drive means;
(g) a first switch means connected to said limit switch, which is normally in a conductive state but which is switched to a non-conductive state upon operation of said limit switch;
(h) a second switch means connected to said limit switch,

which is normally in a non-conductive state but which is switched to a conductive state upon operation of said limit switch;

(i) a first switch means connnected to said detector switch, which is normally in a non-conductive state but which is switched to a conductive state upon operation of said detector switch; and

(j) a second switch means connected to said detector switch, which is normally in a non-conductive state but which is switched to a conductive state upon operation of said detector switch;

in which the respective said first switch means connected to said limit switch and said detector switch are connected in series with one another to said first input of said control means, and in which the respective said second switch means connected to said limit switch and said detector switch respectively are connected in series with one another to said second input of said control means;

whereby said drive means acts on said one of the two press parts with a working force in said direction when both said limit switch and said detector switch have been operated, and movement of said one of the two press parts in said direction is stopped when said detector switch is operated, during a given approach of that press part towards said other press part, in the event that said limit switch has not yet been operated for that given approach, and such movement is also prevented in the event that said detector switch fails in its operated condition prior to operation of said limit switch.

4,694,672

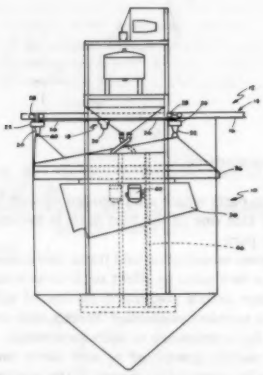
METHOD AND APPARATUS FOR IMPARTING A SIMPLE CONTOUR TO A WORKPIECE

Davis L. Baughman, Rte. 10, Box 105, Hagerstown, Md. 21740

Continuation of Ser. No. 568,403, Jan. 5, 1984, abandoned. This application Sep. 30, 1985, Ser. No. 781,206

Int. Cl.[4] B21J *5/00*

U.S. Cl. 72—53 **15 Claims**



1. Apparatus for imparting a simple contour to a flat workpiece so as to form a wing skin, comprising:

a treatment chamber;

a conveying means extending through said chamber for moving the workpiece through the chamber, the conveying means including a rail means, a transport means, and a workpiece affixing means having an adjusting means for positioning said workpiece in relation to the rail means;

a shot throwing means carried by the treatment chamber capable of discharging shot in a pattern into the treatment chamber and onto a selected side of the workpiece; and

a control system for the shot throwing means to regulate the flow and direction of the shot discharged therefrom, the control system further connected to the adjusting means to direct and position the workpiece to receive the discharge pattern of shot on the selected side in spaced narrow spanwise strips.

4,694,673

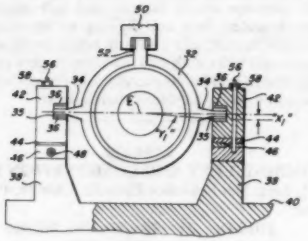
CONTAINER GUIDANCE SYSTEM FOR EXTRUSION PRESS

Raymond F. Boshold, Springfield, Pa., assignor to Wean Industries, Inc., Youngstown, Ohio

Filed Dec. 3, 1985, Ser. No. 804,033

Int. Cl.[4] B21C *27/00*

U.S. Cl. 72—272 **8 Claims**



1. In an extrusion press having a frame, an extrusion die carried by the frame defining an operating centerline axis centrally thereof, a pair of longitudinally extending guideways carried by said frame on either side of said axis and parallel thereto, an extrusion container, a generally annular container holder concentrically of said axis, a single pair of fins extending outwardly from said container holder and having slide faces thereon for slide cooperation with said guideways, means for horizontally adjusting said container with respect to said centerline axis, and, means for vertically adjusting said guideways thereby to vertically adjust said container holder carried thereby to a desired alignment with said centerline axis;

the improvement therein to minimize shifting of said container holder from said predetermined axis alignment during press operation, comprising,

said single pair of fin means having respective planar upper and lower slide faces thereon,

said guideways respectively having a substantially C-shaped cross-section defing upper, lower, and side internal surfaces and having a lateral opening directed toward said holder,

said frame having means positioning said guideways carried coplanar relation on either side of said container holder in substantially thereby in substantially diametric relation thereto, and,

said container holder having the fins thereof extending substantially diametrically of said holder for respective reception within said guideways,

whereby subsequent to vertical adjustment of said guideways to centerline axis alignment, vertical shifting of said guideways and said press frame and radial expansion of said container holder in response to press forces and thermal expansion during press operation is ineffective to materially after container centerline axis alignment.

4,694,674

BENCH SYSTEM FOR REPAIRING AUTOMOBILES

David R. Lawrence, 28102 S. Salo Rd., Mulino, Oreg. 97042

Filed Feb. 24, 1986, Ser. No. 832,531

Int. Cl.[4] B21D *1/12*

U.S. Cl. 72—305 **12 Claims**

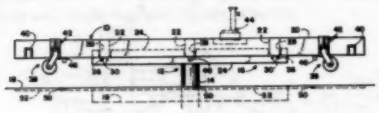
1. An apparatus for repairing the body of a vehicle comprising:

(a) lift means having a pedestal and a generally horizontal bed at the top of said pedestal for selectively raising or lowering said bed;

(b) bench means having a frame for supporting a vehicle thereon;

(c) means for structurally attaching said frame rigidly to the vehicle for movement in unison therewith;

(d) mating means on said bed and frame, respectively, for



releasably attaching said frame supportably atop said bed in a position generally symmetrical with respect to said pedestal and for selectively detaching said frame from said bed with said vehicle attached to said frame for movement of said frame and said vehicle in unison to a location which is remote from said lift means; and

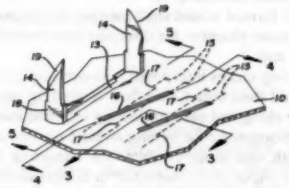
(e) means structurally interlocking said bed and said frame for transferring vertical and horizontal stresses from said frame to said bed so as to strengthen said frame.

4,694,675

METHOD OF MAKING A CONNECTOR PLATE

Edgar A. Mort, Poland, Ohio, assignor to Inter-Lock Steel Company, Inc., East Palestine, Ohio

Filed Aug. 8, 1986, Ser. No. 894,875
Int. Cl.[4] B21D *31/02*
U.S. Cl. 72—325 **4 Claims**



1. A method of fabricating a connector plate with a plurality of sharp ended teeth from sheet steel of a known thickness having first and second substantially parallel surfaces comprising the steps of: forming in a first punching operation, elongated cross sectionally V-shaped grooves in said sheet steel inwardly of said first surface to a depth of at least half the known thickness of said sheet steel, forming, in a second punching operation a plurality of attached teeth in said sheet steel so that one end of each of said teeth is shaped by one inclined side surface of each of said plurality of elongated cross sectionally V-shaped grooves, and moving said punched teeth to positions at right angles to the surfaces of said sheet steel.

4,694,676

METHOD OF MANUFACTURING TRI-POT UNIVERSAL JOINT HOUSINGS

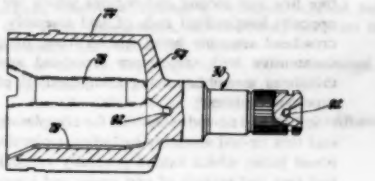
Gerald A. O'Brien, Frankenmuth, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 28, 1982, Ser. No. 402,829
Int. Cl.[4] B21K *1/26*
U.S. Cl. 72—348 **12 Claims**

1. A method of manufacturing a one-piece tri-pot universal joint housing, comprising the steps of:

providing a part having a shank at one end and an enlarged cylindrical head at the opposite end,

backward extruding the enlarged cylindrical head to form a triangularly shaped cup which has an annular triangularly shaped side wall and a triangularly shaped bottom wall,



and draw-ironing the triangularly shaped cup to form a tri-lobal housing portion which has a tri-lobal side wall defining three internal, circumferentially spaced ball tracks and a tri-lobal bottom wall.

4,694,677

ELONGATED TUBE EXPANDER TOOL

George B. Rabe, Sparta, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Feb. 24, 1986, Ser. No. 831,888
Int. Cl.[4] B21D *41/02*
U.S. Cl. 72—393 **9 Claims**

1. An elongated tube expander tool for expanding a tube end at a remote location, said tool comprising:

(a) an elongated central shaft adapted for being inserted into a tube, said shaft being attached at its forward end to a cylinder containing a front piston axially movable in the cylinder forward end portion;

(b) a collet attached to the forward end of said cylinder, said collet having multiple radially expandable fingers at its forward end;

(c) a cylindrical-shaped mandrel having an inwardly tapered front end and a rear end rigidly attached to the forward end of said piston and adapted to be slidably received in said collet fingers;

(d) a retractor piston threadably attached to the rear end of said central shaft, said retractor piston being slidable within a retractor housing; and

(e) an elongated tube centrally disposed within said shaft and said retractor piston, the tube being adapted for supplying fluid pressure from said housing to the rear end of said front piston, whereby said mandrel can be forced forward into said collet fingers so as to radially expand the fingers and thereby radially expand the tube end.

4,694,678

TIE-RODS FABRICATED OF COMPOSITE MATERIALS FOR FORGING PRESSES

Alexander Zeitlin, White Plains, and Adam Zandel, Forest Hills, both of N.Y., assignors to Press Technology Corporation, White Plains, N.Y.

Filed Jan. 21, 1986, Ser. No. 820,019
Int. Cl.[4] B21J *13/04*; B21D *37/12*
U.S. Cl. 72—455 **7 Claims**

1. An improved tie-rod plate in combination with a frame for a large forging press, comprising:

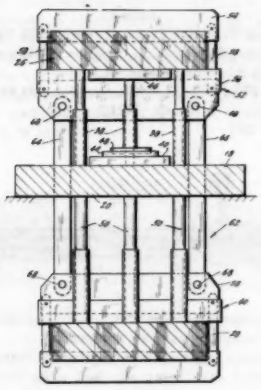
the frame for the large forging press which includes:

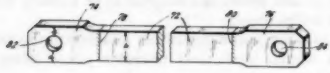
a load opposing, horizontally extending, elongated upper

crosshead assembly having first and second longitudinally opposed end regions;

a load opposing lower crosshead assembly having its respective first and second end regions which are located on opposite longitudinal ends of said assembly, said lower crosshead assembly being spaced from, parallel to, and coextensive with said upper crosshead assembly, said crosshead assemblies being comprised of pluralities of superposed plates;

first and second tie-rod assemblies for completing said frame, said first tie-rod assembly including a plurality of superposed plates which extend generally vertically between said first end regions of said upper and lower crosshead assemblies and said second tie-rod assembly including a plurality of superposed plates which extend between the second end regions of said upper and lower crosshead





assemblies, the respective ends of the plates of said tie-rod assemblies being interleaved with plates which comprise said upper and lower crossheads, a respective link pin through each one of said end regions connecting the tie-rod plates and the crosshead plates to one another;

each plate of said tie-rod assemblies being constituted of the improved tie-rod plate which comprises:

an elongate, single piece, generally flat steel bar which includes a middle section constructed of metal having a predetermined yield strength and first and second end sections welded to longitudinally opposite ends of the middle section and constructed of an alloy steel having a yield strength which is greater than said yield strength of said middle section, each one of said end sections having at least one respective pin hole formed therein for connecting said tie-rod plate in said frame.

4,694,679

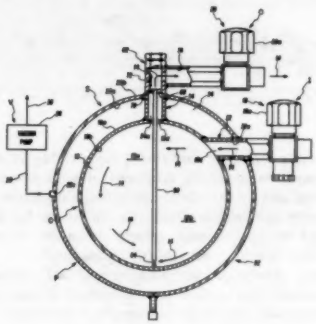
GRAVITOMETER PROVER

James A. Woods, Houston, Tex., assignor to Harold R. Lauterbach, Houston, Tex.

Continuation-in-part of Ser. No. 636,836, Aug. 10, 1984, abandoned. This application Apr. 2, 1986, Ser. No. 847,440

Int. Cl.[4] **G01N** *9/04*

U.S. Cl. 73—1 R **4 Claims**



1. A gravitometer prover for measuring the density of a fluid in communication with and for proving the accuracy of a gravitometer, comprising:

a shell member having an outer surface and an inner surface defining an inner chamber for receiving fluid therein;

a fluid inlet formed in said shell member in communication with said inner chamber for receiving fluid to be directed into said inner chamber;

a fluid outlet formed in said shell member in communication with said inner chamber for directing fluid from said inner chamber; and,

flow restricting means interposed between said inner chamber and said fluid outlet, said flow restricting means comprising an elongated tube projecting into said inner chamber, said elongated tube having an inlet port in communication with said inner chamber for admitting fluid and having an outlet port connected in communication with said fluid outlet.

4,694,680

ULTRASOUND DIAGNOSTIC EQUIPMENT

Yasuhito Takeuchi; Yuichi Hirota; Shinichi Sano, and Shinichi Ishiguro, all of Tokyo, Japan, assignors to Yokogawa Medical Systems, Limited, Tokyo, Japan

PCT No. PCT/JP84/00615, § 371 Date Jul. 26, 1985, § 102(e) Date Jul. 26, 1985, PCT Pub. No. WO85/02761, PCT Pub. Date Jul. 4, 1985

PCT Filed Dec. 26, 1984, Ser. No. 765,435

Claims priority, application Japan, Dec. 27, 1983, 58-247382

Int. Cl.[4] **G01N** *29/00*

U.S. Cl. 73—1 DV **5 Claims**

1. An ultrasound diagnostic equipment comprising

an ultrasound applying probe means for applying ultrasound signals to a body to be examined;

control means;

means, under the control of said control means, for receiving diagnostic signals from said body and for outputting in response thereto transmitted diagnostic signals;

testing means for testing faults in the internal components of said equipment, comprising means for providing test signals indicating presence or absence of faults in said internal components of said equipment;

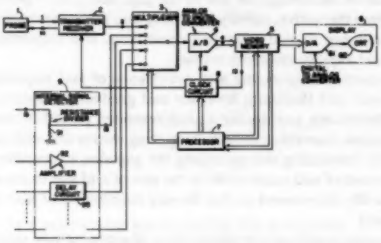
switching means for selectively inputting test signals from said testing means and diagnostic signals from said means

for receiving and selectively outputting said test signals and said diagnostic signals;

converting means, under the control of said control means, for inputting signals from said switching means and for converting said test signals and said diagnostic signals into digital signals;

memory means, under control of said control means, for storing digital signals from said converting means; and

display means for inputting signals stored in said memory means and displaying said signals; wherein



said testing means comprises dividing means, amplifier means and delay means, and means for testing the internal components of said equipment for faults and applying test signals through said switching means to said converting means concurrently with the continued operation of said ultrasound applying probe means; and wherein

said dividing means and said amplifier means of said testing means causes the voltage of the test signals to be within the voltage range of the converting means and said delay means cause the test signals to be within the operating cycle of the converting means.

4,694,681

MEASURING TURBINE

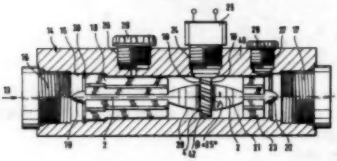
Helmuth Hoffmann, Bergisch-Gladbach, Fed. Rep. of Germany, assignor to Hydrotechnik GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 602,758, Apr. 23, 1984, abandoned, which is a continuation of Ser. No. 364,480, Apr. 1, 1982, abandoned. This application Jun. 24, 1985, Ser. No. 748,033

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1981, 3113112

Int. Cl.⁴ G01F *1/12*

U.S. Cl. 73—3 **8 Claims**



8. A process for adjusting the rotation of a turbine rotor in a measuring turbine wherein said turbine rotor is arranged in a flow channel with its axis in the direction of flow, comprising:

providing an irregular configuration of an annular gap defined by the circumference of the turbine rotor and a flow channel wall to produce braking forces on a circumferential flow component around said turbine rotor;

varying the irregular configuration of said flow channel wall to adjust said braking to an optimum desired level.

4,694,682

ANALYSIS OF ORGANIC ADDITIVES IN PLATING BATHS USING NOVEL CHROMATOGRAPHIC METHODS IN A MASS BALANCE APPROACH

Kurt E. Heikkila, Shoreview; Rodney K. Williams, St. Paul, and Russell J. Pylkki, Minneapolis, all of Minn., assignors to ETD Technology, Inc., Shoreview, Minn.

Continuation of Ser. No. 594,558, Mar. 29, 1984, abandoned. This application Mar. 18, 1986, Ser. No. 842,356

Int. Cl.⁴ G01N *30/04*; B01D *15/08*

U.S. Cl. 73—61.1 C **36 Claims**

1. An analytical method of determining the concentration of an organic analyte or mixtures thereof in an acidic or basic metal plating bath medium using an HPLC apparatus having components that maintain the stability, precision and accuracy of the analytical method which comprises:

(1) obtaining an HPLC apparatus having:

(a) a chromatographic column, containing a stationary phase and a support phase composition sufficient to resolve each organic analyte, having an inlet and an outlet;

(b) a detector means for measuring the relative concentration of each organic analyte having an inlet and an outlet wherein the chromatographic column outlet is attached in liquid communication to the detector inlet;

(c) a second column, having a packing comprising at least a support phase composition, and having an inlet and an outlet wherein the second column outlet is connected in liquid communication with the chromatographic column inlet, wherein the second column support phase composition can substantially reduce the effect of the acidic or basic components of the sample on the reproducibility, precision or accuracy of the analysis;

(d) a sample introduction means having an inlet, an outlet and a sample introduction port, wherein the sample introduction means outlet is attached in liquid communication to the second column inlet;

(e) a source of solvent under pressure; and

(f) a third column, having an inlet and an outlet, having sufficient support phase to saturate the solvent with dissolved support phase, the third column inlet in liquid communication with the source of solvent, and the third column outlet in liquid communication with the sample introduction means inlet;

(2) passing a stream of solvent under pressure through the HPLC apparatus;

(3) applying a sample of a bath medium to be analyzed into the stream of solvent under pressure at the sample introduction port;

(4) passing the bath medium sample in the solvent through the second column wherein the column packing substantially reduces the effect of the acid or basic components of the sample forming an innocuous analyte;

(5) passing the innocuous analyte in the stream of solvent into the chromatographic column, resolving the analyte components into detactable segments utilizing the interaction between the analyte and the stationary phase; and

(6) passing the detectable segments in the solvent into a detector that can produce a signal which as a result of the cooperation of the elements of the HPLC apparatus and the sample obtains a substantially linear relationship between the analyte concentration in the sample and the integration units produced from the signal.

24. An HPLC apparatus that can determine the concentration of an organic analyte or mixtures thereof in an acidic or basic metal plating bath medium, which comprises:

(a) a chromatographic column, containing a stationary phase

and a support phase composition sufficient to resolve each organic analyte, having an inlet and an outlet;

(b) a detector means, for measuring the relative concentration of each organic analyte, having an inlet and an outlet wherein the chromatographic column outlet is attached in liquid communication to the detector inlet;

(c) A second column, having a packing comprising at least a support phase composition, and having an inlet and an outlet wherein the outlet is connected in liquid communication with the chromatographic column inlet, wherein the second column support phase composition can substantially reduce the effect of the acidic or basic components of the sample on the reproducibility, precision or accuracy of the analysis;

(d) a sample introduction means having an inlet, an outlet and a sample introduction port, wherein the sample introduction means outlet is attached in liquid communication to the second column inlet;

(e) a source of solvent under pressure; and

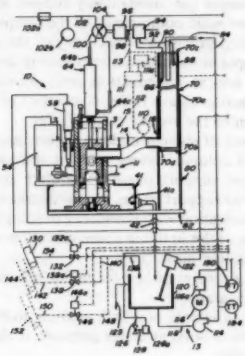
(f) a third column, having an inlet and an outlet, having sufficient support phase to saturate the solvent with dissolved support phase, the third column inlet in liquid communication with the source of solvent, and the third column outlet in liquid comuunication with the sample introduction means inlet.

4,694,683

METHOD TO AUTOMATICALLY DETERMINE THE SIZE DISTRIBUTION OF SHIVE AND ANALYZER THEREFOR

Wladmir Janssen, Montreal, Canada, assignor to Domtar Inc., Montreal, Canada

Filed Feb. 11, 1986, Ser. No. 828,344
Int. Cl.[4] G01N *15/06*
U.S. Cl. 73—63 **10 Claims**



1. An apparatus to automatically determine, on-line, the shive content and shive size distribution of a wood pulp containing shives, said apparatus comprising:

a line having an inlet for receiving a flow of wood pulp containing shives and an outlet whereby said flow of pulp is leaving said line,

a plugging means for closing said line,

a means to automatically actuate said plugging means, as to define a gradually increasing or decreasing gap in said plugging means,

and responsive to said means automatically actuating said pluggins means, a means translating and recording the size of said gap, said gap allowing during operating conditions the passage of the flow of wood pulp and the portion of shives having less than the size of said gap at a given moment, while temporarily preventing the passage of shives exceeding the size of said gap and thereby interfering with the flow of wood pulp through the gap and thereby through said line, thereby causing impedance in said line,

a means for sensing the impedance in said line over a predetermined impedance threshold level,

and responsive to said means of sensing impedance over said threshold level a means for rapidly releasing said plugging means whereby upon each occurence of said impedance over said predetermined threshold level, said impedance sensing means actuates said rapidly releasing means and thereby instantaneously enlarge said gap from said operating conditions as to permit the passage threthrough of said shives exceeding the size of the gap, and a short period of time thereafter, rapidly returning said plugging means and said gap to said operating conditions, and responsive to said rapidly releasing means,

a means for registering said occurrence of said impendance over said threshold level for said gradually increasing or decreasing gap during a predetermined period of time,

a means responsive to said registering means and said means for translating and recording the gap size, to correlate the count of said occurrence to the size of said gap to automatically determined on-line the size distribution of said shive, and

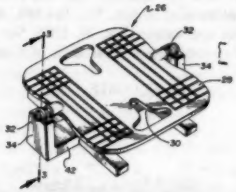
a means to deliver a constant flow of wood pulp in said inlet of said line, said means to deliver a constant flow being selected from the group comprising pressure measuring means, volume measuring means, pressure regulating means, volume regulating means.

4,694,684

DYNAMIC BALANCING FOR SKIS

Harry J. Campbell, III, 667 Mill St., Excelsior, Minn. 55331

Filed Feb. 13, 1986, Ser. No. 829,415
Int. Cl.[4] G01M *1/12*; A63C *11/26*
U.S. Cl. 73—65 **8 Claims**



2. A fixture for accomplishing the optimum dynamic balancing of a pair of skis while being stood upon by the skier, the fixture comprising, in combinations:

a. a frame; and

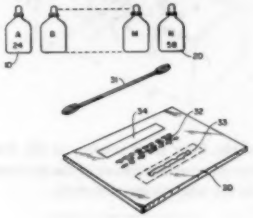
b. platform having a pivot axis on a top surface thereof and mounted on the frame for deflection about the pivot axis by a skier standing on the platform with ski boots on a ski having the midpoint of the running surface thereof aligned with the pivot axis of the platform, the platform constructed and arranged for allowing the tips of the skis when the skier flexes to be deflected upwardly and downwardly by the skier with equal ease when the skier's boot is positioned at a dynamically neutral balance point on the surface of the ski.

4,694,685

APPARATUS AND METHODS FOR DETERMINING THE WETTABILITY OF VARIOUS SUBSTRATES

Franklin A. Dick, Princeton, N.J., assignor to Marbetech Corporation, Princeton, N.J.

Continuation of Ser. No. 619,549, Jun. 11, 1984, abandoned. This application Aug. 26, 1985, Ser. No. 769,443
Int. Cl.[4] G01N 13/00
U.S. Cl. 73—104 13 Claims



1. In a process for use in testing the wettability of various substrates by wiping the substrate with a solution and viewing the wiped substrate to determine whether the solution properly wets the substrate or retracts on the substrate the improvement therewith of using a solution, comprising:

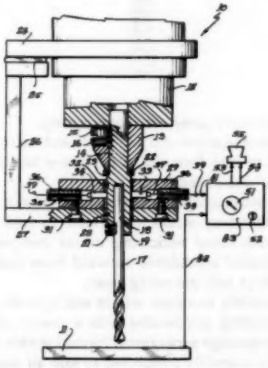
a main blend consisting of a dihydric alcohol and purified water in amounts to provide a surface tension of 56 dynes per centimeter.

4,694,686

CUTTING TOOL WEAR MONITOR

John M. Fildes, Hanover Park, and Robert H. Krueger, Palatine, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 621,834, Jun. 18, 1984, abandoned. This application Feb. 24, 1986, Ser. No. 832,616
Int. Cl.[4] G01N 3/58, 3/56
U.S. Cl. 73—104 12 Claims



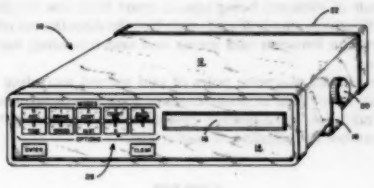
1. A method of detecting tool wear failure for a metal removal operation comprising the steps of monitoring the direct current generated by a cutting tool acting on a metal workpiece during the cutting operation and determining a sharp change in the slope of the current generated plotted against the number of articles cut in comparison with earlier changes in slope thereof as an indication of tool failure.

4,694,687

VEHICLE PERFORMANCE ANALYZER

Wayne A. Bonin, Cedar; Roger D. McCumber, Minnetonka, and Rein S. Teder, Minneapolis, all of Minn., assignors to Vericom Corporation, Minnetonka, Minn.

Filed Apr. 17, 1986, Ser. No. 853,236
Int. Cl.[4] G01M 15/00
U.S. Cl. 73—116 8 Claims



1. A vehicle performance analyzer, comprising:

(a) electrical transducer means for sensing acceleration and deceleration forces and producing electrical signals proportional to said forces;

(b) pulse producing means coupled to said transducer means for converting said electrical signals into a pulse whose width is proportional to said acceleration and deceleration forces;

(c) microprocessor means, including counting means, coupled in controlling relation to said pulse producing means for converting the pulse from said pulse producing means into a digital quantity;

(d) manually operable switch means coupled to said microprocessor means for entering commands into said microprocessor means for directing the nature of the computations to be performed using said digital quantity as an operand; and

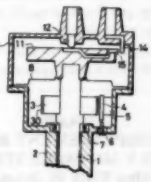
(e) display means for visually indicating results of said computations.

4,694,688

CRANK ANGLE SENSOR

Tadashi Takahashi; Kunio Miyashita, and Syooichi Kawamata, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 4, 1986, Ser. No. 825,975
Claims priority, application Japan, Feb. 8, 1985, 60-23305
Int. Cl.[4] G01M 15/00
U.S. Cl. 73—116 20 Claims



1. A crank angle sensor for generating signals representative of the rotation of the crankshaft of an internal combustion engine comprising:

a magnetic recording medium coupled to said crankshaft so as to rotate in synchronism therewith, and containing a plurality of recording tracks including at least a first and a second track and wherein on respective ones of said recording tracks data is magnetically recorded in the form of unitary magnetic poles, the magnetic poles of said first of said tracks having a pitch P between the poles thereof and being representative of the angle of rotation of said crankshaft, and each of the magnetic poles of said second

track having said pitch P between the poles thereof and being distributed at prescribed locations along said second track with the magnetic polarities thereof being oriented in the same manner as the polarities of the respective magnetic poles of said first track;

a magnetic sensor spaced apart from said magnetic recording medium and containing respective pairs of magnetoresistive elements arranged to be magnetically coupled with each of the respective recording tracks of said recording medium, the magnetoresistive elements of a respective pair of elements being spaced apart from one another by effectively one-half said pitch P in the direction of relative motion between said sensor and said recording medium; and

wherein the magnetic poles of said second recording track are distributed at predetermined locations along said second track in respective pluralities corresponding to the number of cylinders of said engine.

4,694,689

METHOD AND DEVICE FOR SPIN-TESTING OF TURBOCHARGER ROTOR

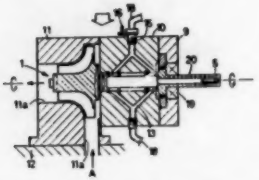
Keiji Kawasaki, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan

Filed Mar. 18, 1986, Ser. No. 840,754

Claims priority, application Japan, Mar. 23, 1985, 60-59072

Int. Cl.[4] G01M *15/00*

U.S. Cl. 73—118.1 **8 Claims**



1. A method for spin-testing a turbocharger rotor, said rotor including a shaft portion which is fixed to an assembly of component parts which include a thrust bearing, a spacer, at least one of a sleeve portion and compressor rotor portion, and a lock nut, wherein the improvement comprises the steps of:

preparing an integral composite member consisting of at least two of said component parts;

dynamically balancing said turbocharger rotor, without said shaft portion fixed to said assembly;

placing said turbocharger rotor and said integral composite member in a testing device, such that said shaft portion and said assembly are fixed to each other by said lock nut, and are rotatable as a unit; and

rotating said turbocharger rotor and said assembly in said testing device, to effect said spin-testing.

4,694,690

MEASURING DISPLACEMENT BETWEEN TWO RELATIVELY MOVABLE STRUCTURES

Robert Jones, Cambridge; Keith W. Jones, Histon, and William R. S. Baxter, Cambridge, all of England, assignors to Pandrol Limited, London, England

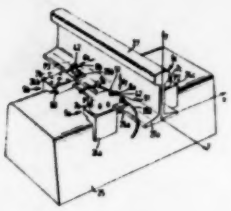
Filed Jul. 30, 1986, Ser. No. 891,652

Claims priority, application United Kingdom, Aug. 2, 1985, 8519473; Jul. 3, 1986, 8616298

Int. Cl.[4] G01M *19/00*

U.S. Cl. 73—146 **16 Claims**

1. A method of measuring movement of a railway rail with respect to an underlying structure, wherein a first device is fixed with respect to the rail and a second device is fixed with respect to the underlying structure, one of these devices including a split field filter and the other including first means for directing light at the filter and second means for transmitting light which has passed through the filter, and wherein there is supplied to the first means light of two wavelengths and the light which has passed through the filter, which is affected by



the position of the filter with respect to the first and second means, is used to provide a measure of the movement of the rail with respect to the underlying structure.

4,694,691

AIR PRESSURE GAUGE TOOL

John G. Johnston, Oak View, Calif., assignor to M. O. Enterprises, Inc., Walnut Grove, Calif.

Filed May 19, 1986, Ser. No. 864,455

Int. Cl.[4] B60C *23/02*; G01L *7/00*

U.S. Cl. 73—146.8 **4 Claims**

1. An air pressure gauge tool comprising:

a housing having a fore end and an aft end, an operating head attached to said fore end, a graspable handle section attached to said aft end;

an air pressure gauge assembly mounted within said housing, visual indicating means connected to said air pressure gauge, said visual indicating means comprises an elongated member extendable outward from said aft end and spaced from said operating head;

a valve assembly mounted within said operating head, said valve assembly connecting with a source of pressurized air, an air passage arrangment formed within said housing, said valve assembly connected to said air pressure gauge, whereby upon said valve assembly being connected to the source of pressurized air the air pressure is conducted to said valve assembly and a numerical value corresponding to the amount of air pressure is readable by said visual indicating means;

accessory tool engaging means formed within said operating head of said housing, whereby an accessory tool is to be removably connected to said accessory tool engaging

means to permit said tool to be usable in a manner other than to determined air pressure; and

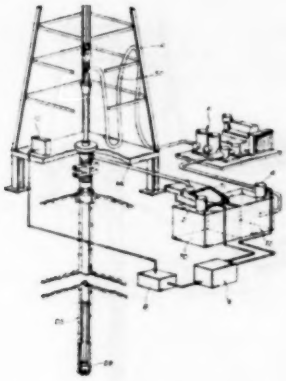
a locking pin connectable with said operating head, whereby said locking pin is to connect with the accessory tool to retain such in a fixed position on said operating head.

4,694,692

DRILLING FLUID DENSITY MEASUREMENT SYSTEM

Gregory D. Brown; Darrel E. Clark, and Rodger W. Schuermann, all of Norman, Okla., assignors to Technical Oil Tools Corporation, Norman, Okla.

Filed Jun. 4, 1986, Ser. No. 870,343
Int. Cl.[4] G01N 9/28; E21B 47/00
U.S. Cl. 73—155 15 Claims



1. An apparatus for measuring the density of a drilling fluid within a reservoir at the surface of a well, the drilling fluid being circulated through the subterranean well bore during drilling thereof, the circulation path of the drilling fluid including the reservoir; the apparatus comprising: first and second tubular means continuously disposed in the reservoir, each for introducing a gas at different depths within the drilling fluid in the reservoir; flow-regulating means for delivering the gas to the first and second tubular means at selected flow rates; a differential pressure transmitter; pneumatic means for communicating the pressure-opposing introduction of the gas into the drilling fluid from the first and second tubular means to the differential pressure transmitter, the differential pressure transmitter comprising means for emitting an output signal related to the difference in pressure opposing introduction of the gas at the first and second tubular means; zeroing means for intermittently determining a value of the differential pressure transmitter output signal corresponding to zero differential pressure; level check means for intermittently determining if the level of the drilling fluid in the reservoir is above the first and second tubular means; and microprocessor means for regulating the zeroing means and the level check means and for correlating the differential pressure transmitter output signal to the density of the drilling fluid in the reservoir.

4,694,693

CHECK VALVE TEST METHOD USING TRUNCATED ACCUMULATOR BLOWDOWN

Thomas J. Gerlowski, Crafton Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 734,373, May 15, 1985, abandoned.
This application Nov. 6, 1986, Ser. No. 928,640
Int. Cl.[4] G01M 19/00
U.S. Cl. 73—168 21 Claims

17. A method for testing a normally closed check valve connected in series with an isolation valve at an outlet of an accumulator tank in a passive injection system for supplying liquid to a reactor cooling system in a pressurized light water nuclear power system, the passive injection system being connected to a low pressure system and supplying liquid to the reactor cooling system only during abnormally low pressure in the reactor cooling system, the accumulator tank having at least two upper taps and at least two lower taps with at least two standpipes each connected to a corresponding pair of upper and lower taps via valves and each of the standpipes having lower ends with drain valves connected thereto, said method comprising the steps of:

(a) establishing a range for acceptance criteria applicable to test data provided by a test procedure comprising the steps of:

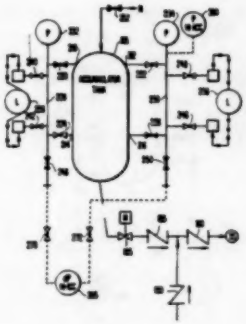
(ai) connecting a high accuracy differential pressure measuring device to the drain valves connected to the at least two standpipes;

(aii) connecting a high accuracy pressure measuring device to one of the at least two standpipes;

(aiii) closing one of the valves connected between one of the standpipes and one of the upper taps and another of the valves connected between the other standpipes and the lower tap connected thereto;

(aiv) isolating the passive injection system from the low pressure system;

(av) adjusting upstream pressure in the accumulator tank upstream of the check and isolation valves as necessary to attain a first pressure level;



(avi) adjusting downstream pressure in the reactor cooling system downstream of the check and isolation valves as necessary to attain a second pressure level lower than the first pressure level;

(avii) opening the isolation valve completely and then immediately closing the isolation valve;

(aviii) recording differential pressure versus time measured by the differential pressure measuring device during step (avii) as indicating a change in level in the accumulator tank;

(aix) recording pressure versus time measured by the high accuracy pressure measuring device; and

(ax) recording downstream pressure versus time in the reactor cooling system during step (avii);

(b) performing a preoperational test including the test procedure of step (a);

(c) performing a subsequent test after operation of the pressurized light water nuclear power system has begun, the subsequent test being performed according to the test procedure in step (a);

(d) determining any differences between the pressures versus time recorded in steps (aviii), (aix) and (ax) during the preoperational test and the subsequent test, respectively; and

(e) comparing the differences determined in step (d) to deter-

mine whether the differences are within the acceptance cirteria to verify operability of the check valves.

4,694,694

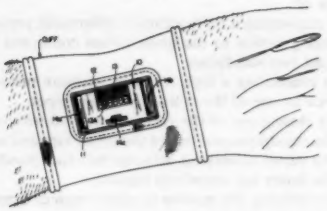
SOLID STATE ACCUMULATING ALTIMETER

Connor G. Vlakancic, San Jose; Ruy J. Pereira, Lafayette, and Larry R. Goodman, Laguna Niguel, all of Calif., assignors to Vertical Instruments, Inc., Lafayette, Calif.

Filed Jan. 6, 1986, Ser. No. 816,552

Int. Cl.[4] G01L *7/12*

U.S. Cl. 73—386 **10 Claims**



1. A solid state altimeter device, comprising:

an integrated circuit solid state pressure sensor including a deformable silicon diaphragm with a semiconductor strain gauge in the diaphragm;

a vacuum chamber operatively attached to the diaphragm such that the vacuum of the vacuum chamber is applied to one side of the diaphragm, with the opposite side of the diaphragm exposed to atmospheric pressure;

electrical means connected to the semiconductor strain gauge for conducting an analog signal from the strain gauge representing pressure difference between atmospheric and the vacuum chamber;

a housing containing the pressure sensor and the vacuum chamber;

microprocessor means in the housing for receiving the signal from the electrical means and for converting the signal into an altitude value;

display means mounted in the housing and connected to the microprocessor means for displaying values as controlled by the microprocessor means, to a user;

calibration means connected to the microprocessor means for enabling the user to manually calibrate the altimeter device to a reference value; and

accumulator means included in the microprocessor means for accumulating altitude change in one direction, disregarding altitude changes in the opposite direction, for a selected interval, and including an accumulation display associated with the display means for displaying said altitude change in one direction.

4,694,695

SEWER PIPE SMOKE BLOCKING DEVICE

Rickey E. Sewell, 1100 Hilltop Rd., and Glenwood H. Sewell, 1259 N. Buckner, Apt. 103, both of Derby, Kans. 67037

Filed Sep. 24, 1986, Ser. No. 911,076

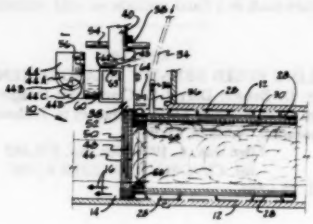
Int. Cl.[4] G01M *3/28*

U.S. Cl. 73—40.5 R **9 Claims**

1. A sewer pipe smoke blocking device for lowering into a manhole and inserting in a sewer pipe, the device preventing smoke introduced upstream in the pipe from passing therepast while allowing sewer water to pass therethrough, the device comprising:

a hollow cylindrical housing having a diameter less than the diameter of the sewer pipe and adapted for receipt therein;

an inflatable bladder surrounding the outer circumference of the housing, the bladder when inflated securing the housing to the inner circumference of the sewer pipe; and



a gate assembly mounted on the housing, the assembly when lowered, engaging the top of the sewer water flowing through the hollow housing.

4,694,696

VIBRATION-TYPE GYRO APPARATUS

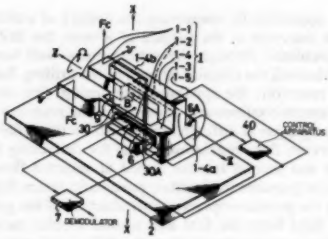
Takeshi Hojo; Shin-Ichi Kawada, both of Kuroiso; Michio Fukano, Ohtahara; Kanshi Yamamoto, Kuroiso; Youji Okamura, Nasumachi; Kazuteru Sato, Kuroiso; Masahiko Saito, Yokosuka, and Fuyuki Hane, Nasumachi, all of Japan, assignors to Kabushikikaisha Tokyo Keiki, Tokyo, Japan

Filed Oct. 23, 1985, Ser. No. 790,527

Claims priority, application Japan, Oct. 25, 1984, 59-224755; Oct. 25, 1984, 59-224756; Oct. 25, 1984, 59-224759; Oct. 25, 1984, 59-224760

Int. Cl.[4] G01P *9/04*

U.S. Cl. 73—497 **3 Claims**



1. A vibration-type gyro apparatus comprising: a vibrating tuning fork-type vibrator having at least a vibration mass portion and a pair of leg portions; a drive apparatus for continuously vibrating said vibrator; a displacement detector formed of a first piezo-electric element for detecting a vibration of said vibrator; a first pre-amplifier having a first input resistance R1 and supplied with an output from said first piezo-electric element; a control apparatus connected to said first pre-amplifier for controlling said drive apparatus so as to continuously and stably vibrate said vibrator; a second piezo-electric element for detecting an angular vibration of said vibrator around an input axis passing through the center of said vibrator and in parallel to said leg portions of said vibrator; a second pre-amplifier having a second input resistance R2 and supplied with an output from said second piezo-electric element; and a demodulator for synchronously rectifying an output from said second piezo-electric element with respect to the output from said first piezoelectric element; wherein said input resistance R1 of first pre-amplifier is selected to be a value substantially expressed as $R1 \approx 1/C1\omega$ where C1 is an electrostatic capacitance of said first piezo-electric element and ω is an angular frequency of said vibrator, and said second input resistance R2 is selected to

be a value substantially expressed as $R2 \approx 1/C2\omega$ where C2 is an electrostatic capacity of said second piezo-electric element.

4,694,698

METHOD OF MEASURING FACTOR OF STRESS CONCENTRATION BY UTILIZING ULTRASOUND

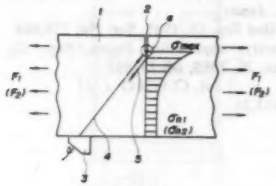
Takeshi Miyajima, Makabemachi, Japan, assignor to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

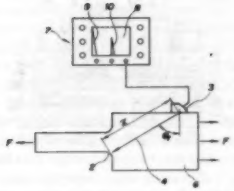
PCT No. PCT/JP85/00013, § 371 Date Apr. 22, 1986, § 102(e) Date Apr. 22, 1986

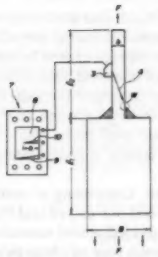
PCT Filed Jan. 16, 1985, Ser. No. 855,665

Int. Cl.[4] G01N *29/00*; G01L *1/00*

U.S. Cl. 73—570 **6 Claims**







1. A method of measuring the stress concentration factor at a stress-concentrated portion of a mechanical member having an undercut located at a portion where the cross-section of the member varies abruptly, said undercut extending into the member and having a bottom, said method comprising:

causing an ultrasonic wave to impinge on said stress-concentrated portion of said member in a first stressed state;

detecting the acoustic pressure of the ultrasonic wave reflected from the bottom of the undercut while said member is in said first stressed state;

gradually increasing or decreasing the stress on said member to cause an increased or decreased stressed state and in a direction for causing a variation of the shape of the bottom of the undercut;

continuing to cause said ultrasonic wave to impinge on said stress-concentrated portion of said member;

detecting the acoustic pressure of the ultrasonic wave reflected from said bottom of the undercut while said undercut is in the increased or decreased stressed state;

comparing the acoustic pressure of the ultrasonic wave reflected from the bottom of the undercut in said first stressed state with the acoustic pressure when said stress concentrated portion is in the increased or decreased stressed state; and

determining the stress concentration factor at the stress-concentrated portion using as an evaluation index the change ratio of the compared values of the acoustic pressure.

4,694,699

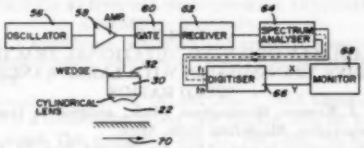
ACOUSTIC MICROSCOPY

John D. N. Cheeke, Sherbrooke, Canada, assignor to Universite de Sherbrooke, Sherbrooke, Canada

Filed Jun. 30, 1986, Ser. No. 880,664

Int. Cl.[4] G01N *29/30*

U.S. Cl. 73—606 **36 Claims**



1. A method for obtaining information at a microscopic scale of a specimen by scanning said specimen with acoustic waves, said method comprising the steps of:

propagating acoustic waves of a plurality of frequencies toward said specimen, said specimen reflecting said acoustic waves, the position of a propagated acoustic wave in a reference plane which is generally perpendicular to the direction of propagation of said acoustic waves toward said specimen being a function of the frequency of the acoustic wave;

controlling the frequency of the acoustic waves in order to control the position of the propagated acoustic waves in said reference plane; and

detecting and analyzing said reflected acoustic waves to obtain said information.

4,694,700

ULTRASONIC SENSOR FOR ELECTRONIC SECTORIAL SCANNING AND ECHOGRAPH INCORPORATING SUCH A SENSOR

Charles Maerfeld, Antibes, France, assignor to CGR Ultrasonic, Paris, France

Filed Sep. 25, 1985, Ser. No. 779,855

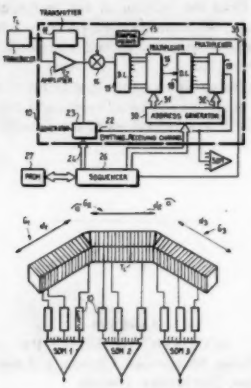
Claims priority, application France, Sep. 25, 1984, 84 14708

Int. Cl.[4] G01N *29/04*

U.S. Cl. 75—628 **17 Claims**

1. An ultrasonic sensor for electronic sectorial scanning, comprising: a plurality of groups of transducer elements formed into consecutive portions which are respectively

aligned to present a convex outline to an object of scanning, each portion being distinguished from its adjacent portion by



at least one of a discontinuity and a different radius of curvature.

4,694,701

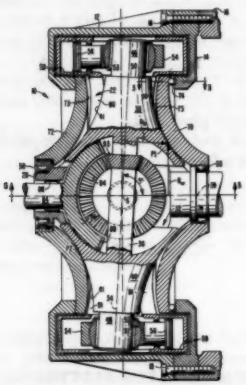
RADIALLY ORIENTED NUTATIONAL TRACTION DRIVE TRANSMISSION WITH LARGE RANGE OF SPEED RATIOS

Yves J. Kemper, Birmingham, Mich., assignor to Tractiontec Corporation, Bloomfield Hills, Mich.

Continuation-in-part of Ser. No. 797,481, Nov. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 746,230, Jun. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 739,414, May 30, 1985, abandoned. This application Jan. 31, 1986, Ser. No. 824,664

Int. Cl.[4] F16H *15/44, 15/16*

U.S. Cl. 74—191 **19 Claims**



1. In a continuously variable traction drive transmission having a frame, an alpha body supported by said frame for rotation about a first axis, a beta body supported by said alpha body on a second axis intersecting said first axis at a point of axes intersection, said beta body having a pair of members on opposite sides of said point of axis intersection for defining beta rolling surfaces of revolution about said second axis, omega body means for defining a pair of omega rolling surfaces of revolution about said first axis, said beta and omega surfaces being in rolling friction engagement at two points of contact in a plane containing said first and second axes, said two points of contact lying in diagonally opposite quadrants defined by said first axis and a line perpendicular to said first axes at said point of axes intersection, and means for varying the radius ratio of said beta and omega surfaces at said points of contact, the improvement comprising:

means for shifting said points of contact between adjacent diagonal quadrants as defined by said first axes and said line so as to reverse the rotational direction of said beta body on said second axis.

4,694,702

VORTEX SHEDDING FLOWMETER

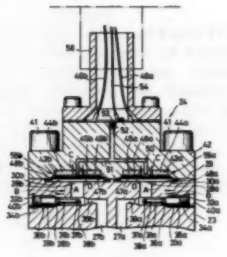
Hiroyuki Amemori, Kawasaki; Shigeru Nishiyama, Hiratsuka, and Tetsuo Iwamoto, Yokohama, all of Japan, assignors to Tokico Ltd., Japan

Filed Sep. 11, 1985, Ser. No. 774,804

Claims priority, application Japan, Sep. 12, 1984, 59-138477[U]; Jun. 20, 1985, 60-134895

Int. Cl.[4] G01F *1/32*

U.S. Cl. 73—861.24 **7 Claims**



1. A vortex shedding flowmeter for measuring a flow rate of a fluid which flows through a flow passage, said vortex shedding flowmeter comprising: a bluff body arranged in said flow passage for generating

Karman vortices of said fluid, said bluff body being provided with a pair of differential pressure introducing holes for introducing a pressure change caused by the generation of the Karman vortices of said fluid, said differential pressure change holes opening to respective side surfaces of said bluff body and penetrating through said bluff body to open to one end of said bluff body; and

a main detecting part which is independent of said bluff body,

said main detecting part comprising a mounting member which is mounted on said one end of said bluff body, a pair of detecting means provided in said mounting member and a detecting circuit, said pair of detecting means being arranged separated from each other in a longitudinal direction of said flow passage and comprising a pair of first recesses provided on said mounting member, a pair of fixed electrodes mounted in said pair of first recesses, a pair of movable electrodes provided in said pair of first recesses with a predetermined distance from the respective pair of fixed electrodes, a channel provided in said mounting member for communicating a pair of spaces formed between said pair of fixed electrodes and said pair of movable electrodes, and an incompressible fluid filled up in said pair of spaces and said channel, each of said movable electrodes comprising a diaphragm which is displaced responsive to the pressure change in said fluid introduced through a corresponding one of said pair of differential pressure introducing holes and received by a surface of said diaphragm opposite to surfaces in contact with said incompressible fluid, said pair of fixed electrodes and said pair of movable electrodes constituting a pair of variable capacitors, said detecting circuit generating an

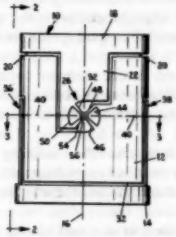
electrical output responsive to changes in capacitances of said variable capacitors of said pair of detecting parts.

4,694,703

CIRCUMFERENTIALLY ORIENTED FLEXURE SUSPENSION

Gregory S. Routson, Kentwood, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Jun. 28, 1984, Ser. No. 625,518
Int. Cl.[4] G01C *19/02*
U.S. Cl. 74—5 F **10 Claims**



1. In a two-axis, monolithic flexure, hinge suspension system for inertially sensitive devices wherein first, second and third cylindrical portions are slightly axially spaced from each other along a common axis and connected by pairs of flexure hinges therebetween, one pair of flexure hinges defining a first flexure axis which is perpendicular to the common axis, another pair of said flexure hinges defining a second flexure axis which is perpendicular to said common axis and to said first flexure axis, whereby said first flexure axis and said common axis lie in a first plane and said second flexure axis and said common axis lie in a second plane perpendicular to said first plane; each flexure hinge having a pair of flexure leaves extending between adjacent cylindrical portions, the improvement which comprises:

each said pair of flexure leaves being circumferentially mounted to adjacent cylindrical portions such that each flexure leaf in a pair of said flexure leaves has one end mounted to one cylindrical portion at one side of an associated one of said first and second planes, and an opposite end mounted to another cylindrical portion at another side of said one associated plane such that one of said leaves is in tension and one of said leaves is in compression when axial forces are applied to said cylindrical portions, whereby G-sensitivity drift resulting from resonant-frequency sensitivity changes of the flexure hinges is minimized.

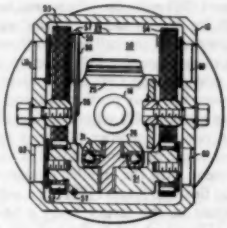
4,694,704

INFINITELY VARIABLE TRACTION ROLLER TRANSMISSION

Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.

Filed Aug. 4, 1986, Ser. No. 892,373
Int. Cl.[4] F16H *15/08, 15/10*
U.S. Cl. 74—200 **4 Claims**

1. An infinitely variable traction roller transmission comprising: coaxial input and output shafts; oppositely disposed toric elements, one being supported by each of said shafts for rotation therewith; at least two motion transmitting rollers disposed between said toric elements in radial symmetry with respect to the axis of the input and output shafts; and means for forcing said toric elements toward each other to cause frictional engagement of the motion transmitting rollers with the opposed surfaces of the toric elements; a support structure for each of said rollers, each of said support structures including a pivot shaft having a pivot axis normal to a plane which includes the axis of the input and output shafts, said pivot shafts having flanges arranged opposite one another, each provided with a circumferential groove and an endless cable loop extending around said flanges of the opposite pivot shafts with a cross-over therebetween, said cable having tube sections of a given length firmly mounted thereon and said grooves having



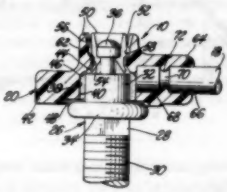
areas of increased width and of a circumferential length corresponding to the given length of said tube sections, said tube sections being fittingly received in said groove areas of increased width for operative engagement of said cable loop with said pivot shafts.

4,694,705

MOLDED TERMINAL FOR REMOTE CONTROL ASSEMBLY (LOLLIPOP)

Thomas J. Frankhouse, Southfield, and Arthur L. Spease, Livonia, both of Mich., assignors to Teleflex Incorporated, Limerick, Pa.

Continuation of Ser. No. 742,363, Jun. 7, 1985, abandoned, which is a continuation of Ser. No. 392,515, Jun. 28, 1982, abandoned. This application Jan. 12, 1987, Ser. No. 6,252
Int. Cl.[4] F16C *1/14*
U.S. Cl. 74—501 R **13 Claims**



1. A motion transmitting remote control assembly **(10)** of the type for transmitting motion in a curved path, said assembly **(10)** comprising: a guide means **(12)**; core means **(18)** movably supported by said guide means **(12)** and extending therefrom to provide a variable extending length of said core means **(18)** between said guide means **(12)** and one end **(68)** of said core means **(18)**, said extending length defining a line of force; and an integral terminal member **(20)** for operatively interconnecting said extending length of said core means **(18)** and a control member **(22)** of the type having a body portion **(32)** and a smaller ball pin **(36)** extending therefrom, and characterized by said terminal member **(20)** including an enlarged base portion **(42)** having a neck portion **(64)** extending along said extending length of said core means **(18)** for retaining a portion of said extending length therein on said line of force, an opening **(38)** extending completely through said terminal member **(20)** on an axis perpendicular to said line of force and having a containing portion **(40)** on said line of force for containing the body portion **(32)** of the control member **(22)** therein and for absorbing the applied forces as said terminal member **(20)** is moved along the line of force, said containing portion **(40)** being disposed in said enlarged base portion **(42)** on one side thereof, said opening **(38)** of said terminal member **(20)** further including a plurality of flexible fingers **(50)** extending laterally from the side of

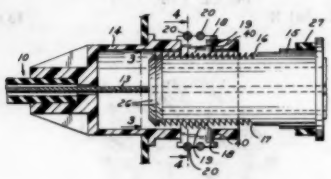
said enlarged base portion (42) opposite said one side, about said containing portion (40) and offset axially with respect to said opening from said line of force and arranged about said axis of said opening (38), said fingers (50) defining lips (60,62) extending into said opening and defining a smaller diameter portion of said opening (38) than said containing portion (40) thereof, said fingers (50) extending from said base portion (42) to free distal ends for flexing radially of said axis of said opening (38) during insertion of the ball pin (36) through the smaller diameter portion of said opening (38) to retain the ball pin (36) disposed within said opening (38) independently of actuating engagement between the body portion (32) and said opening in said enlarged base portion (42) whereby the relatively smaller ball pin (36) of a control member (22) may be freely passed through the larger containing portion (40) of said opening (38) and into engagement with the smaller diameter presented by said fingers (50) to flex said fingers (50) outwardly until the ball pin (36) is therepast as the larger body portion (32) of the control member (22) which trails the ball pin (36) is inserted into said larger containing portion (40) for transmitting said applied forces therebetween while held therein by said fingers (50) engaging the ball pin (36) at a position between the body portion (32) and the ball pin (36).

4,694,706

CONTROL CABLE CONDUIT LENGTH ADJUSTMENT DEVICE

Norman B. Lichtenberg, Tecumseh, and Adam W. Chaczyk, Allen Park, both of Mich., assignors to Acco Babcock Inc., Fairfield, Conn.

Continuation of Ser. No. 829,762, Feb. 14, 1986, abandoned.
This application Mar. 12, 1987, Ser. No. 23,895
Int. Cl.[4] F16C 1/10
U.S. Cl. 74—501.5 R **6 Claims**



1. A self-adjusting control cable conduit length adjustment device comprising

a tubular outer detent member defining an opening,

an inner adjuster member extending into said opening of said detent member and guided thereby for longitudinal movement,

a conduit connected to one end of said detent member, and

a control cable extending through the detent and adjuster member,

said adjuster member having opposed sets of longitudinally spaced ratcheting teeth,

said detent member having opposed radial openings,

a set of opposed detent pawls mounted in said openings,

said openings guiding said pawls for radial movement only with respect to said outer detent member,

each pawl having an outer radial end and an inner radial end,

a plurality of teeth on the inner end of each pawl complementary to and engaging a respective set of teeth on the adjuster member,

said teeth on said detent member and said adjuster member being unsymmetrical in cross section so that a one-way ratcheting action is permitted of the adjuster member axially inwardly relative to the detent member,

spring means engaging the outer ends of said pawls exteriorly of the detent member and yieldingly urging said pawls radially inwardly,

such that when a predetermined force is applied on the inner adjuster member tending to force the adjuster member axially inwardly relative to the detent member, the pawls are caused to move radially outwardly and ratchet automatically so that the force moves the adjuster member axially inwardly relative to the detent member thereby shortening the effective length of the conduit, thus lengthening the inner member,

said spring means yieldingly urging said pawls radially inwardly comprising at least one circumferentially extending arcuate spring surrounding the detent member and engaging the radially outer ends of said pawls,

said spring being C-shaped with ends positioned circumferentially between said pawls, said detent member having means thereon for preventing said spring from rotating such that the engagement with the pawls is maintained and that substantially equal spring force is applied to each said pawl,

said means on said detent member comprising a radial projection extending between the ends of said spring.

2. A self-adjusting control cable conduit length adjustment device comprising

a tubular outer detent member defining an opening,

an inner adjuster member extending into said opening of said detent member and guided thereby for longitudinal movement,

a conduit connected to one end of said detent member, and

a control cable extending through the detent and adjuster member,

said adjuster member having opposed sets of longitudinally spaced ratcheting teeth,

said detent member having opposed radial openings,

a set of opposed detent pawls mounted in said openings,

said openings guiding said pawls for radial movement only with respect to said outer detent member,

each pawl having an outer radial end and an inner radial end,

a plurality of teeth on the inner end of each pawl complementary to and engaging a respective set of teeth on the adjuster member,

said teeth on said detent member and said adjuster member being unsymmetrical in cross section so that a one-way ratcheting action is permitted of the adjuster member axially inwardly relative to the detent member,

spring means engaging the outer ends of said pawls exteriorly of the detent member and yieldingly urging said pawls radially inwardly,

such that when a predetermined force is applied on the inner adjuster member tending to force the adjuster member axially inwardly relative to the detent member, the pawls are caused to move radially outwardly and ratchet automatically so that the force moves the adjuster member axially inwardly relative to the detent member thereby shortening the effective length of the conduit and lengthening the effective length of the inner member,

said adjuster member being rotatable relative to said detent member, circumferential portions of said adjuster member circumferentially between said sets of ratcheting teeth are smooth such that resetting of the device may be achieved by manually rotating the detent member relative to the adjuster member to cause the pawls to be moved radially outwardly and thereby disengage the teeth on the pawls from the teeth on the adjuster member and cause the teeth on the pawls to contact said smooth circumferential portions so that the detent and adjuster member can be moved longitudinally relative to one another after which the detent member and adjuster member may be rotated relative to one another to re-engage the teeth of the pawls and adjuster member,

said adjustment member including radial tooth portions aligned circumferentially with said smooth portions for engaging said pawls to prevent inadvertent disassembly of the device when the adjustment member is moved axially outwardly relative to said detent member.

3. A self-adjusting control cable conduit length adjustment device comprising

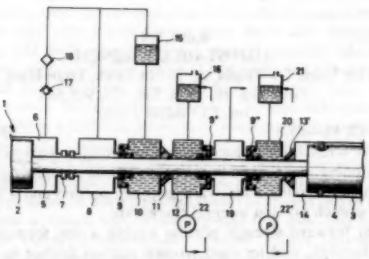
a tubular outer detent member defining an opening,
an inner adjuster member extending into said opening of said detent member and guided thereby for longitudinal movement,
a conduit connected to one end of said detent member, and
a control cable extending through the detent and adjuster member,
said adjuster member having opposed sets of longitudinally spaced ratcheting teeth,
said detent member having opposed radial openings,
a set of opposed detent pawls mounted in said openings,
said openings guiding said pawls for radial movement only with respect to said outer detent member,
each pawl having an outer radial end and an inner radial end,
a plurality of teeth on the inner end of each pawl complementary to and engaging a respective set of teeth on the adjuster member,
said teeth on said detent member and said adjuster member being unsymmetrical in cross section so that a one-way ratcheting action is permitted of the adjuster member axially inwardly relative to the detent member,
at least one circumferentially extending arcuate C-shaped spring having spaced ends surrounding the detent member and engaging the outer ends of said pawls exteriorly of the detent member and yieldingly urging said pawls radially inwardly into engagement with the respective set of teeth on the adjuster member,
means between said C-shaped spring and said detent member for preventing rotation of said C-shaped spring relative to said detent member such that engagement is maintained between the spring and the pawls and substantially equal spring force is applied to each said pawl,
such that when a predetermined force is applied on the inner adjuster member tending to force the adjuster member axially inwardly relative to the detent member, the pawls are caused to move radially outwardly and ratchet automatically so that the force moves the adjuster member axially inwardly relative to the detent member thereby shortening the effective length of the conduit and lengthening the effective length of the inner member.

4,694,707

ROD SEAL DEVICE FOR STIRLING ENGINES

Daisaku Kobayashi; Tunesaku Itaba, Kashiwazaki, and Yutaka Momose, Anjyo, all of Japan, assignors to Kabushiki Kaisha Riken, Tokyo and Aisin Seiki Kabushiki Kaisha, Aichi, both of, Japan

Filed Feb. 12, 1986, Ser. No. 828,664
Claims priority, application Japan, Feb. 20, 1985, 60-23261[U]
Int. Cl.[4] F16H *57/02*; B01D *19/00*
U.S. Cl. 74—606 A **3 Claims**



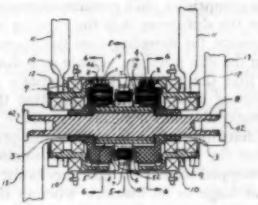
1. A rod seal device for a Stirling engine, comprising:
a piston rod having a first end connected to an operating piston for the engine and a second end connected to a guide piston disposed in a crank case;
a compression chamber defined by said operating piston and a cylinder of the engine and including therein a working gas for the engine;
a first intermediate chamber surrounding an outer periphery of said piston rod and being connected to said compression chamber and kept to maintain a minimum level of pressure of said working gas;
a high pressure oil chamber disposed next to said first intermediate chamber and surrounding the outer periphery of said piston rod, said high pressure oil chamber being connected to said compression chamber via a check valve to recirculate the working gas leaked thereinto to said compression chamber;
a first low pressure oil chamber disposed next to said high pressure oil chamber via an oil seal member and surrounding the outer periphery of said piston rod, said first low pressure oil chamber being connected to a first low pressure oil reservoir which is exposed to the atmospheric pressure to discharge any gas introduced into said first low pressure oil chamber to the atmosphere;
a first scraper seal disposed next to said first low pressure oil chamber and surrounding the outer periphery of said piston rod;
a second intermediate chamber disposed next to said first low pressure oil chamber via said first scraper seal and surrounding the outer periphery of said piston rod, said second intermediate chamber being exposed to the atmosphere for allowing any gas introduced thereinto to be discharged to the atmosphere;
a second scraper seal disposed next to said second intermediate chamber and surrounding the outer periphery of said piston rod;
a second low pressure oil chamber disposed next to said second intermediate chamber via said second scraper seal and surrounding the outer periphery of said piston rod, said second low pressure oil chamber being connected to a second low pressure oil reservoir which is open to the atmospheric pressure to discharge any gas introduced into said second low pressure oil chamber to the atmosphere;
a second oil pump disposed between said second low pressure oil chamber and said second low pressure oil reservoir to positively discharge any gas introduced into said second low pressure oil chamber to he atmosphere; and
a further oil seal disposed between said second low pressure oil chamber and a working gas chamber in said crank case for a power take-off device.

4,694,708

SINGLE SPEED TRANSMISSION FOR PEDAL-PROPELLED VEHICLE

Dirck T. Hartmann, 4121 Morningstar Dr., Huntington Beach, Calif. 92649

Filed May 15, 1986, Ser. No. 845,960
Int. Cl.[4] F16H *1/28*; B62M *1/02*
U.S. Cl. 74—750 B **2 Claims**



1. In a pedal-propelled vehicle including a frame, a driving wheel having a hub, and a pedal drive shaft on the axis of said hub for concentric rotation therewith, an improved single speed transmission located within said hub and comprising:
a pair of internally toothed, axially spaced ring gears with an

integral cylindrical extension of each of said ring gears fixed to said frame;

a ball bearing seated on each of said integral cylindrical extensions and supporting opposite ends of said hub;

a pair of axially spaced bearings seated inside each of said integral cylindrical extensions for the support of said pedal drive shaft;

a pair of axially spaced planetary gear carriers mounted on said pedal drive shaft for rotation therewith;

three externally toothed planetary gears rotatably mounted 120 degrees apart on each of said planetary gear carriers and meshed with said internally toothed ring gears;

an externally toothed sun gear located between said pair of axially spaced planetary gear carriers and meshed with said planetary gears for support and concentric rotation about said pedal drive shaft; and

a conventional free-wheel ratchet means located between said pair of axially spaced ring gears for driving said hub from said sun gear.

4,694,709

CONTROL OF A VEHICLE AUTOMATIC TRANSMISSION

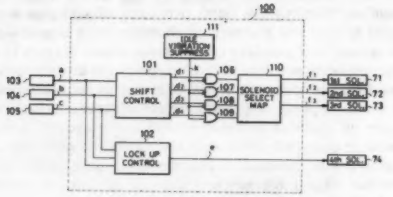
Toshiyuki Kikuchi, Higashi-Hiroshima, and Koichi Yamamoto, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 4, 1985, Ser. No. 772,427

Claims priority, application Japan, Sep. 8, 1984, 59-188666; Sep. 8, 1984, 59-188667

Int. Cl.[4] B60K *41/06*

U.S. Cl. 74—866 **2 Claims**



1. A vehicle having vehicle brake means, an engine provided with engine output control means having an idle position, an automatic transmission comprising a torque converter having a turbine, a multiple-stage transmission gear mechanism connected with the turbine of the torque converter and having a neutral gear stage, a first gear stage and at least one higher gear stage, gear stage selecting means for selecting one of the gear stages, and a shift lever having a neutral range and at least one running range for operating the gear stage selecting means so that the neutral gear stage is selected when the shift lever is in the neutral range and one of the first and higher gear stages is selected when the shift lever is in the running range, the improvement comprising shift position detecting means for detecting that the shift lever is in the running range, engine idle detecting means for detecting that the engine output control means is in the idle position, vehicle stop detecting means for detecting that the vehicle is substantially stopped, vehicle brake detecting means for detecting that the vehicle brake means is engaged, control means responsive to output signals from said detecting means to operate the gear stage selecting means when the shift lever is in the running range and the vehicle is stopped so that the gear mechanism is shifted to the higher gear stage in an instance wherein the engine output control means is in the idle position and the vehicle brake means is engaged, which vehicle further includes idle up detecting means for detecting that the engine is operated with an increased idle speed, said control means including means for prohibiting a shift up to the higher gear stage when the engine is operated with the increased idle speed under a condition wherein the shift lever is in the running range, the vehicle is stopped, the engine output control means is in the idle position and the vehicle brake means is engaged.

4,694,710

METHOD OF MAKING A BLANK OF A DRILL BIT

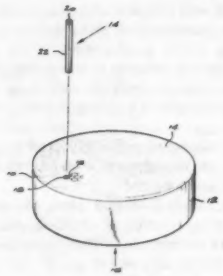
Cornelius Phaal, 34 Rutland Avenue, Craighall Park, Johannesburg, Transvaal, South Africa

Filed Jun. 2, 1986, Ser. No. 869,974

Claims priority, application South Africa, Jun. 13, 1985, 85/4462

Int. Cl.[4] B23P *15/32*

U.S. Cl. 76—108 R **6 Claims**



1. A method of producing a blank for a drill bit comprising providing a cylindrically-shaped composite abrasive compact having a diamond or cubic boron nitride compact bonded to a cemented carbide backing and having major flat end surfaces in which one flat end surface is the diamond or cubic boron nitride compact and the other is the cemented carbide backing, severing the composite abrasive compact along plane perpendicular to the flat surfaces and from one flat end surface to the other flat end surface to produce a plurality of sticks polygonally-shaped end-on, each sever plane defining side surfaces of adjacent sticks, and longitudinally rounding each stick to produce from it a blank for a drill bit which is round end-on, comprises a diamond or cubic boron nitride compact bonded to an elongated cemented carbide rod, and has a diameter in the range 0.5 to 5 mm and a diameter to length ratio in the range 1:3 to 1:20.

4,694,711

ADJUSTABLE WRENCH

Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan

Filed Sep. 10, 1986, Ser. No. 905,533

Int. Cl.[4] B25B *13/00*

U.S. Cl. 81—57.5 **15 Claims**

1. A wrench for tightening and loosening a workpiece having a polygonal-shaped body, said wrench comprising:

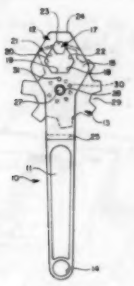
a handle having a rearward gripping portion and a forward wrench portion integral therewith;

said forward wrench portion having a slot formed therethrough, said forward wrench portion further having an aperture including a gripping portion being formed therethrough;

a wrench plate being removeably received in the slot;

said wrench plate including a periphery having a plurality of notches formed therein, such that each of said notches may be selectively positioned in communication with the

aperture, whereby the workpiece may be disposed between the gripping portion of the aperture and received



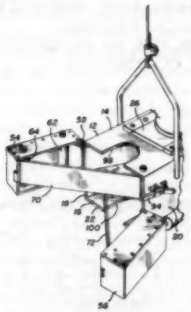
within a selective notch of the wrench plate where it is gripped for the tightening and removal thereof.

4,694,712

WELL STRING SECTION SPINNING TOOL

Hubert M. Doss, 803 N. Madison St., Magnolia, Ark. 71753

Filed Sep. 26, 1985, Ser. No. 780,674
Int. Cl.[4] B25B *21/00*
U.S. Cl. 81—57.17 **10 Claims**



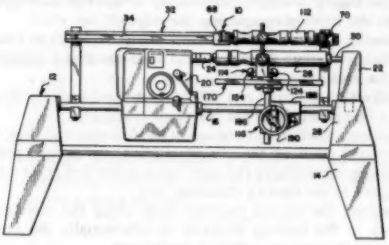
1. A turning tool for laterally engaging an elongated member intermediate its opposite ends and turning said elongated member about its longitudinal axis, said tool including a main body having a first end and a second end remote from said first end, said body being adapted to be shifted among a path extending between said ends toward and away from said elongated member with said second end facing away from said elongated member, said body also defining a pair of opposite sides extending between said ends, said first end including at least one elongated door including base and free ends, said base end being pivotally mounted from one side of said first end for swinging about a first axis between a closed position extending across said first end an open position extending outwardly from said first end, said first end defining a notch therein paralleling said first axis and opening endwise outwardly of said first end, driven drum means journalled from the second end of said body about a second axis paralleling said first axis, said body and door including strategically located rollers journalled therefrom about axes generally paralleling the said first axis and aligned with said drum means, an endless flexible drive member trained about said rollers and drum with said drive member including a positive bight extending about each of said rollers and said drum means, said drive member including a reach thereof extending between one of said rollers journalled from said body and a closely adjacent roller journalled from the free end of said door and deflectable inwardly of said notch into a negative bight for passing about said elongated member in friction driving engagement therewith, said negative bight opening in a direction inclined at least generally 45° relative to the direction in which said notch opens, and means operatively connected between said body and door to releasably retain said door in the closed position thereof, said body including a pair of said doors staggered relative to each other along the longitudinal extent of said notch and with the base ends of said doors pivotally mounted from opposite sides of said body, each of said doors including a pair of rollers journalled therefrom and the opposite sides of said first end of said housing each including a roller journalled therefrom, said drum means including axially spaced circumferential zones thereof registered with said doors and said tool including a pair of endless flexible drive members each trained about a corresponding drum circumferential zone and a corresponding pair of door rollers as well as one of the housing rollers, said drive members each including a negative bight of at least 270° and less than 360° in angular extent for frictionally drivingly engaging an equal angular extent of the outer periphery of said elongated member with said drive members engaged with axially circumferential zones of said elongated member.

4,694,713

DUPLICATING SYSTEM FOR A LATHE

Steven A. Snyder, Spring Valley; Jack Smith, Huber Heights; David D. Flora, Arcanum, and Robert L. Bartlett, Dayton, all of Ohio, assignors to Shopsmith, Inc., Dayton, Ohio

Filed Jun. 17, 1986, Ser. No. 875,433
Int. Cl.[4] B23B *3/28*
U.S. Cl. 82—14 R **17 Claims**



1. For use with a multipurpose woodworking machine capable of performing lathe operations and including a pair of way tubes, a motorized headstock, and a tailstock, a lathe duplicating system comprising:

means releasably attachable to said woodworking machine for holding a pattern to be duplicated above the headstock and tailstock thereof, said holding means including means for supporting a pattern to extend alternately substantially parallel to or substantially perpendicular to a rotational axis of a workpiece on said woodworking machine;

platform means adjustably mountable on said woodworking machine and including a substantailly flat table top, a carriage and means for mounting said carriage on the way tubes, and means for raising and lowering said top relative to said carriage; and

a tool stand positioned on said table top and having means enabling slidable movement thereon, said tool stand including upper follower means for contacting a pattern in said holding means, and lower cutting tool means, extending below said upper follower means, for engaging a workpiece mounted on said woodworking machine, whereby said platform means is adjustable to position said cutting tool means at a predetermined elevation relative to a workpiece.

4,694,714

PROCESS AND APPARATUS FOR CHANGING REELS IN CONNECTION WITH PACKAGING MACHINES

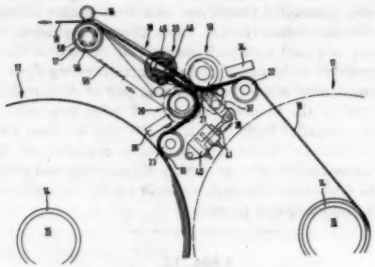
Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Aug. 27, 1985, Ser. No. 769,904

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 3436217

Int. Cl.[4] B65B *41/10*; B65H *19/10*

U.S. Cl. 83—13 26 Claims



22. A method for replacing a first material sheet (10) which wound around a first reel (11) with a second material sheet (13) which is wound around a second reel (12), the first and second material sheets being made of a relatively stiff packaging material, particularly thin cardboard, for removal of rim pieces of a cigarette flip-top pack, the method being for use in connection with a packaging machine, particularly a cigarette packaging machine, the method comprising the steps of:

(a) passing the first material sheet along a conveyor track (18), in a feeding direction, to at least one of a separation and a packaging system;

(b) delivering the front end (29) of the second material sheet to a first point along the conveyor track;

(c) cutting a trailing end portion of the first material sheet at a second point on the conveyor track, the second point being at substantially the same point as the first point with respect to the feeding direction; and

(d) passing the second material sheet along the conveyor track in the feeding direction at substantially the same time as the step of cutting is performed.

4,694,715

SLICING DEVICE FOR BREAD OR THE LIKE

Sebastiaan C. E. Jongerius, Renswoude, Netherlands, assignor to Jongerius B.V., Soesterberg, Netherlands

Filed Sep. 8, 1986, Ser. No. 904,872

Claims priority, application Netherlands, Sep. 17, 1985, 8502547

Int. Cl.[4] B26D *1/48*

U.S. Cl. 83—72 16 Claims

1. A machine for slicing bread of the like, comprising

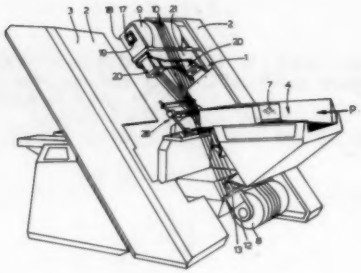
(1) a stationary frame;

(2) first and second drums rotatably mounted on the stationary frame in spaced apart opposed relation;

(3) a plurality of endless slicer bands trained over the first and second drums, the plurality of slicer bands extending substantially parallel to each other;

(4) tensioning means for tensioning the slicer bands by displacement of one of the drums toward or away from the other drum, the tensioning means including cylinder-plunger mechanisms disposed at opposite ends of the displaceable drum;

(5) the stationary frame being disposed adjacent one end of the drums and having support arms extending laterally from the stationary frame between the loops of the slicer bands to the opposite end of the drums, the cylinder-plunger mechanisms supporting the displaceable drum being carried by one of the laterally extending arms and the other drum being mounted on supports secured to the



other of the laterally extending arms whereby the drums are accessible from the open side opposite the stationary frame and thereby facilitate mounting and dismounting of the slicer bands on and from the drums.

4,694,716

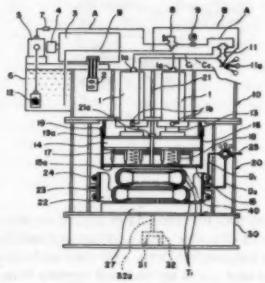
MACHINE FOR CUTTING SOLID BODIES

Tsutomu Sakamoto, Hirakata, Japan, assignor to Kansai Environmental Development Co., Ltd., Japan

Filed Feb. 28, 1986, Ser. No. 834,537

Int. Cl.[4] B26D *1/09*

U.S. Cl. 83—112 5 Claims



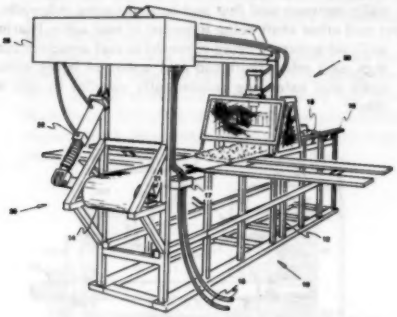
1. A machine for cutting solid bodies comprising: at least one pressing cylinder means having a vertically movable piston rod; a blade base fixed to the lower end of said piston rod; said blade base having an underside on which a plurality of downwardly directed cutting blades are mounted; a presser plate disposed below said blade base and having a corresponding number of slits through which said blades are allowed to retractably project downward; said presser plate having a center to which a vertical sliding rod is fixed at the lower end thereof; said blade base having a center through which said sliding rod slidably extends; said sliding rod being provided at an intermediate portion thereof with a flange; said blade base having an upper face engagable with said flange and capable of lifting said presser plate; a receiver arranged below said presser plate for placing thereon a solid body or bodies to be cut; rotary drive means for rotating said receiver a predetermined small angle after a predetermined number of cutting operations; and discharge means for horizontally moving cut solids.

4,694,717

SINGLE PASS SOD CUTTING MACHINE FOR PRODUCING HEXAGONALLY SHAPED PLUGS

Gordon C. Boots, Orlando, Fla., assignor to A. Duda & Sons, Inc., Oviedo, Fla.

Filed Aug. 5, 1985, Ser. No. 762,296
Int. Cl.[4] B26D *3/20, 5/20*
U.S. Cl. 83—222 12 Claims



1. A machine for automatically cutting large sections of coarse grasses into relatively small, hexagonally shaped pieces for ready packaging and subsequent transplanting, comprising sod advancing means in combination with sod cutting means, said sod advancing means being intermittently operative and serving to advance the sections of sod toward said sod cutting means, said sod cutting means involving the use of a plurality of closely grouped blade means arrayed in an open, non-linear configuration and designed to move periodically in unison downwardly into forceful cutting contact with sod to be cut, each blade of said blade means being elongate, with its cutting edge disposed at its lowermost portion, and with the cutting edges of said blades being located in a common plane, at least one side edge of each blade being in touching contact with the side edge of an adjacent blade, with said blades being disposed in such an array that adjacent cutting edges reside at approximately 120° angles to each other, such that together said cutting edges create an incomplete hexagonal pattern in which no closed areas are defined, such downward cutting movements being accomplished while said sod is momentarily stationary, such downward cutting movements being closely followed in each instance by an upward movement of said blade means, thereafter to permit the sod to advance for several inches preparatory for the next cutting cycle, means for coordinating the movements of said sod cutting means with the operation of said sod advancing means, such that forward movement of a section of sod is in each instance prevented until said blade means have accomplished the cut and are again clear of the section of sod being cut, whereby each time the cutting edges of said blade means contact a section of sod during a cutting movement, a plurality of relatively small, generally hexagonally-shaped pieces of sod are created.

4,694,718

TUBE CUT OFF APPARATUS

Robert J. Kinsley, Elmhurst, Ill., assignor to Vogel Tool & Die Corporation, Stone Park, Ill.

Continuation of Ser. No. 648,612, Sep. 7, 1984, Pat. No. 4,563,927, which is a continuation of Ser. No. 427,715, Sep. 29, 1982, abandoned. This application Sep. 30, 1985, Ser. No. 782,203
The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.
Int. Cl.[4] B23D *21/00, 25/04*
U.S. Cl. 83—319 16 Claims

1. In a tube cut-off apparatus being provided with upper and lower die plates, and a tube cut-off means extending from the upper die plate, and a tube clamping assembly being mounted on said lower die plate and the upper die plate having a downward extending cam means for actuating the tube clamping assembly,

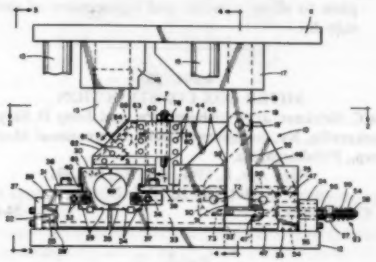
the tube clamping assembly comprising:

a jaw supporting guide member supported on said lower die plate,

a first jaw structure carried on said guide member,

a second jaw structure carried on said guide member adjacent said first jaw structure and opposing said first jaw structure for clamping and supporting a tube to be cut,

said first and second jaw structures having first and second engaging means respectively, said first and second engaging means engaging the guide member and supporting said first and second jaw structures for movement thereon,



a retaining carriage means being operatively associated with and entrapping each jaw structure,

a reaction member carried on said guide member and operatively associated with and engaging with said retaining carriage means,

the reaction member and the second jaw structure being adapted to be moved apart responsive to movement of the associated cam means, thereby moving the first and second jaw structures together to clamp the tube; and

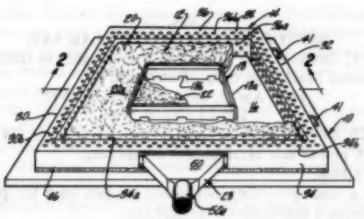
blade support means on the second jaw structure, said blade support means supporting a scarfing blade structure for reciprocal movement thereon the scarf the tube attendant to the cutting thereof.

4,694,719

VACUUM DIE CUTTING APPARATUS

Martin M. Levene, and William W. Lessard, both of Kitchener, Canada, assignors to Ontario Die Company Limited, Waterloo, Canada

Filed Jul. 10, 1985, Ser. No. 753,380
Int. Cl.[4] B26D *7/02*
U.S. Cl. 83—451 13 Claims



1. A steel rule die assembly comprising:

(a) a plate;

(b) a steel rule die adapted to be removably positioned on said plate and including a base member and a steel rule

upstanding from said base member and having a sharpened upper edge;

(c) a frame member of closed loop configuration and having a size to fit on said plate in surrounding relation to said base member of said steel rule die;

(d) resilient sealing means positioned on the underside of said frame member and extending in a closed loop totally around the underside of said frame member for sealing coaction with said plate; and

(e) means mounting said frame member for movement between

(1) an operative position in which it is positioned on said plate in surrounding relation to said steel rule die with said resilient sealing means sealingly coacting with said plate and

(2) a die change position in which it is removed from said plate to allow removal and replacement of said steel rule die.

4,694,720

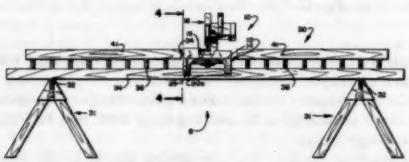
MITER BOX CONSTRUCTION

Louis C. Brickner, Jr., Pittsburgh, Pa., and Jerry D. Skipworth, Burkesville, Ky., assignors to Delta International Machinery Corp., Pittsburgh, Pa.

Filed Apr. 8, 1986, Ser. No. 848,591

Int. Cl.[4] B27B *5/24*

U.S. Cl. 83—471.3 **24 Claims**



1. A portable power tool suitable for use in combination with horizontal support rails; said power tool comprising:

(a) a motor unit;

(b) base means operatively engaging the motor unit; and

(c) slots means in operative contact with the base means and including a plurality of downwardly projecting legs and a plurality of downwardly projecting studs;

(i) said legs being oriented to selectively support said base means upon a surface, if desired, and

(ii) said legs and studs forming a plurality of rail slots, each slot being formed between a leg and an associated stud, said slots being oriented and arranged for engaging selected horizontal support rails;

(d) whereby the portable power tool may selectively be raised a comfortable height above a ground plane.

4,694,721

MOTOR PACK FOR CIRCULAR SAW

Louis C. Brickner, Jr., Pittsburgh, Pa., assignor to Delta International Machinery Corp., Pittsburgh, Pa.

Filed Apr. 8, 1986, Ser. No. 848,592

Int. Cl.[4] B27B *5/24*

U.S. Cl. 83—471.3 **24 Claims**

1. A power saw arrangement comprising:

(a) a base;

(b) a table pivotably connected to said base for pivoting about a substantially vertical axis;

(c) a circular saw blade having a first radius, and a central axis;

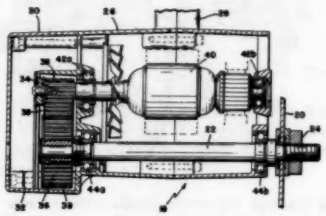
(d) a motor unit pivotably connected to said table, said motor unit including: a casing; a motor armature having a longitudinal axis; an arbor shaft; a speed reducer arrangement; and, a casing extension;

(i) said casing having a first sidewall and a second sidewall;

(ii) said motor unit including a pair of armature bearings operatively mounted in said casing and arranged to rotatably support said armature in extension substantially between said first and second casing sidewalls;

(iii) said motor unit including a pair of arbor bearings operatively mounted in said casing and arranged to rotatably support said arbor shaft in extension substantially between said first and second casing sidewalls;

(iv) said arbor shaft being mounted in said arbor bearings and said armature being mounted in said armature bearings, said arbor shaft and said armature being spaced apart and extending substantially parallel to one another;



(v) said speed reducer arrangement being mounted substantially adjacent said casing first sidewall and including means operatively coupling said armature to said arbor shaft; said casing extension being arranged to enclose said speed reducer arrangement;

(vi) said circular saw blade being mounted on said arbor shaft substantially adjacent said casing second sidewall, and exterior to said casing;

(vii) said saw blade being mounted relative to said armature such that a line coaxial with said armature longitudinal axis intersects said saw blade within a distance of said first radius from said saw blade central axis;

(e) a distance between said arbor bearings being at least about one-third a distance between said armature bearings.

4,694,722

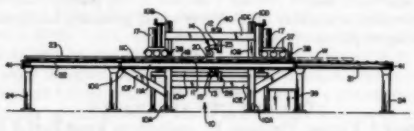
APPARATUS FOR SCORING AND CUTTING WALLBOARD AND THE LIKE

Ronald T. Collier, Columbus, and Robert E. Thompson, Hebron, both of Ohio, assignors to Cardinal Industries, Inc., Columbus, Ohio

Filed Aug. 6, 1985, Ser. No. 763,044

Int. Cl.[4] B26D *3/08, 1/24*

U.S. Cl. 83—885 **1 Claim**



1. Apparatus for cutting a workpiece of sheet material such as wallboard, plasterboard or the like, said apparatus comprising:

(a) a floor mounted support frame;

(b) a table disposed on the frame for carrying the workpiece in a generally horizontal plane;

(c) drive means mounted on the frame and disposed above the table for holding the workpiece against said table and for moving said workpiece in a selected direction of travel;

(d) a pair of relatively elongated spaced apart, parallel, vertically aligned, stationary tool guides extending from the support frame generally transversely to the direction of travel of the workpiece and disposed, respectively, above and below the table, each of said tool guides having at least one free end;

(e) at least one tool assembly slidably mounted on and readily removable from the free end of each of the tool guides and provided with means for releasably locking said tool assembly in any of a plurality of selected positions on said tool guide; and

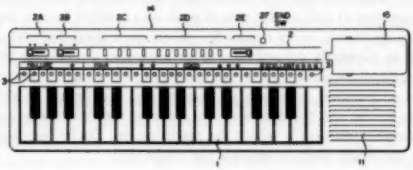
(f) a generally circular blade freely rotatable one each tool assembly and disposed thereon for penetrating the workpiece as said workpiece is moved along the table, said blade being formed with a plurality of circumferentially aligned teeth projecting radially outwardly from a tapered, peripheral edge portion of said blade.

4,694,723

TRAINING TYPE ELECTRONIC MUSICAL INSTRUMENT WITH KEYBOARD INDICATORS

Isao Shinohara, Tokorozawa, and Itsuro Yoshimoto, Tokyo, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1986, Ser. No. 856,697
Claims priority, application Japan, May 7, 1985, 60-96236
Int. Cl.[4] G09B *15/04*; G10H *1/36, 7/00*
U.S. Cl. 84—1.03 **15 Claims**



1. A keyboard type electronic musical instrument, comprising:

keyboard means including a plurality of keys with respective allotted musical notes, and display elements each provided for a different one of said keys;

memory means for storing note data and duration data forming a musical piece in accordance with a progression of the musical piece;

musical tone signal generating means for generating a musical note signal with a tone determined by an operated key of said keyboard means;

indicating means connected to receive the note data and duration data from said memory means for lighting, in response to the note data, a corresponding display element in said keyboard means to indicate a key to be operated;

comparing means for comparing the note data successively read out from said memory means and key code signals generated by said keyboard means and representing notes of keys successively operated;

counting means coupled to said comparing means for counting instances of non-coincidence between a key specified by the note data and a key operated on said keyboard means; and

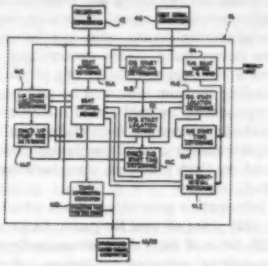
display means for displaying a number result of the instances of the non-coincidence between the note data and the operated keys.

4,694,724

SYNCHRONIZING SIGNAL GENERATOR FOR MUSICAL INSTRUMENT

Tadao Kikumoto, and Isato Murakami, both of Osaka, Japan, assignors to Roland Kabushiki Kaisha, Osaka, Japan

Filed Jun. 21, 1985, Ser. No. 747,555
Claims priority, application Japan, Jun. 22, 1984, 59-129745
Int. Cl.[4] G10H *1/42*
U.S. Cl. 84—1.03 **6 Claims**



1. A synchronized sound recording and reproducing system including

(a) sound information recording and reproducing means for recording base sound information and time code information on a recording medium and reproducing the base sound information therefrom, said recording medium being movable with respect to said sound information recording and reproducing means, said time code information being representative of different physical locations on said recording medium, said locations being arranged in the direction of movement of the recording medium, said sound information recording and reproducing means being operative to reproduce said time code information substantially in synchronism with said base sound information,

(b) base sound generating means for generating base sounds on the basis of the base sound information reproduced by said sound information recording and reproducing means,

(c) beat signal generating means for generating a beat signal each time the beat signal generating means is actuated,

(d) synthesized-sound signal generating means operative to have additional sound information memorized therein and to reproduce the stored additional sound information in accordance with a time base expressed by synchronizing signals providing tempo information, and

(e) additional-sound synthesizing means for synthesizing and generating additional sounds on the basis of the additional sound information reproduced by said synthesized-sound signal generating means,

comprising in combination

(A) beat interval determining means for determining beat intervals on the basis of the time code information reproduced by said sound information recording and reproducing means and the beat signals generated by said beat signal generating means

(B) beat interval memorizing means for storing values respectively representative of the beat intervals determined by said beat interval determining means and allowing the stored values to be successively read out therefrom when required,

(C) playback start location determining means for determining a particular physical location on said recording medium as the location at which playback operation is to be started by said sound information recording and reproducing means, said particular physical location corresponding to the first one of the best signals produced by said beat signal generating means, said playback start location de-

termining means determining said particular physical location in response to said first one of the beat signals and to said time code information reproduced by said sound information recording and reproducing means,

(D) playback start location memorizing means for memorizing a value representative of said particular physical location of said recording medium,

(E) synchronized playback start time determining means for determining the point of time at which synchronized playback operation is to be started simultaneously by said sound information recording and reproducing means and said synthesized-sound signal generating said additional-sound synthesizing means, said synchronized playback start time determining means determining said point of time when a value representative of a physical location on said recording medium indicated by said time code information reproduced by said sound information recording and reproducing means is substantially equalized with said value representative of said particular physical location memorized by said playback start location memorizing means, and

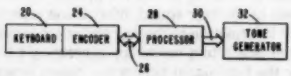
(F) tempo information generating means which is to become active at said point of time for generating tempo information on the basis of the values successively read out from said beat interval memorizing means and supplying the tempo information as synchronizing signals to said synthesized-sound signal generating means to enable the synthesized-sound signal generating means to reproduce said additional sound information and said additional-sound synthesizing means to generate said additional sounds in synchronism with the base sounds generated by said base sound generating means.

4,694,725

SOUND GENERATING SYSTEM FOR A KEYBOARD

Daniel B. Seevers, and John J. Rohulich, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Sep. 3, 1985, Ser. No. 772,224
Int. Cl.[4] G01H *1/46*
U.S. Cl. 84—1.27 **10 Claims**



1. In a data terminal device having a keyboard including a plurality of key members for generating data when operated, a system for generating an audio signal in response to the operation of a key member in the keyboard comprising:

means mounted in said keyboard for generating an audio output signal;

means coupled to said signal generating means for outputting a plurality of electrical signals at a first predetermined frequency for operating said signal generating means to output an audio signal at a first decibel level in accordance with the frequency of the electrical signals outputted by said outputting means;

means coupled to said outputting means for varying the frequency of the electrical signals outputted by said outputting means including counting means for counting a predetermined count, said varying means outputting a control signal to said outputting means upon said counting means reaching said predetermined count whereby said outputting means will vary the frequency of the electrical signal in accordance with the time the control signal is generated; and

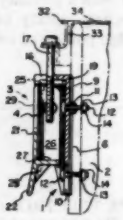
encoding means coupled to said counting means and each of the key members for outputting a different predetermined count to said counting means in response to the operation of each of said key members whereby said varying means will control the frequency of the electrical signals outputted by said outputting means in accordance with the key member operated enabling the signal generating means to output an audio output signal at a decibel level which varies with the operation of each of the key members.

4,694,726

DRUM SKIN TIGHTENING ARRANGEMENT

Frank Silvestri, Calgary, Canada, assignor to Greg Taylor, Calgary, Canada

Filed Jul. 31, 1984, Ser. No. 636,219
Claims priority, application Canada, Aug. 19, 1983, 435013
Int. Cl.[4] G10D *13/02*
U.S. Cl. 84—413 **3 Claims**



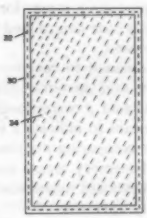
1. A drum skin tightener comprising one-piece bracket means including a base plate permitting mounting of the bracket means on the body of the drum near one open end thereof, and socket means integral with said base plate, said socket means being substantially closed but open in a direction facing away from the open drum end; lever means including lug means for releasable and pivotal insertion into said socket means, whereby said lever means can be releasably and pivotally engaged in said socket means with said bracket means; and pin means in said lever means for receiving a threaded end of a bolt to pivotally connect the lever means to a retaining rim on the drum, whereby said lever means can be rotated between a locked position in which the lug means seat firmly in said socket means and the retaining rim tensions the drum skin, and a releasable position in which the retaining rim can be removed from the drum body to release the drum skin.

4,694,727

SITU DISPOSABLE GEL CANISTER

Lloyd G. Jones, Dallas, and Lawrence R. Stowe, Plano, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 3, 1985, Ser. No. 771,929
Int. Cl.[4] F42B *3/00*
U.S. Cl. 86—20.15 **14 Claims**



1. A method for making a disposable propellant device for use in controlled pulse fracturing which device is suspended in a wellbore comprising:

(a) forming a disposable outer liner comprised of a flexible porous material consumable upon ignition of a propellant;

(b) impregnating said porous material with a combustible

solidifiable gel mixture in an amount sufficient to form a solid enclosure of a thickness capable of containing said propellant;

(c) solidifying said gel to form a solid enclosure in combination with said liner sufficient to contain said propellant while said enclosure is suspended in said wellbore; and

(d) enclosing within said liner a propellant means and means for igniting said propellant.

4,694,728

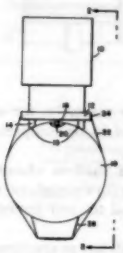
FIBER OPTIC GUIDED MISSILE AIMER

Steven G. McDaniel, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 29, 1985, Ser. No. 718,034

Int. Cl.[4] B64D *3/02*

U.S. Cl. 89—1.11 **3 Claims**



1. A missile aimer for use in accurately aiming a missile comprising a gyrocompassing north finding module mounted in a housing structure, a base member secured to said housing structure on one side of said housing structure, a pair of rails mounted on the opposite side of said base member, an alignment pin mounted in said opposite side of said base member and being spaced an equal distance from each rail, and straps mounted on opposite edges of said base member for clamping said aimer to a missile, whereby when said housing and base member are mounted on a missile with the pin projecting into an alignment opening of the missile and with the rails contacting the skin of the missile and clamped relative thereto by the straps, the gyrocompassing north finding module then being adapted for allowing one to accurately aim the missile relative to a target.

4,694,729

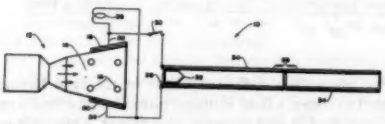
ELECTROMAGNETIC LAUNCHER ASSEMBLY

James R. Hall, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 4, 1986, Ser. No. 835,926

Int. Cl.[4] F41F *1/02*

U.S. Cl. 89—8 **4 Claims**



1. A method for producing and directing current for activation of an electromagnetic launcher assembly comprising:

producing pulsed, ionized, conductive hot gases having a velocity of about 2000 meters/second with a magnetohydrodynamic power generator;

channeling and directing the conductive hot gases produced by the generator into a generator channel having a magnetic field associated therewith to produce electric power;

conducting the electric power from the generator channel to an energy storage means to store electric power energy;

selectively routing the electric power from the energy storage means through assembly circuitry;

causing the generator to function as a non-mechanical opening switch by interrupting current flow through assembly circuitry;

increasing electrical resistance in the channel;

causing the collapse of the magnetic field associated with the generator field to generate a flyback voltage; and

directing the flyback voltage to the launcher assembly to activate same.

4,694,730

PROP CONTROL VALVE

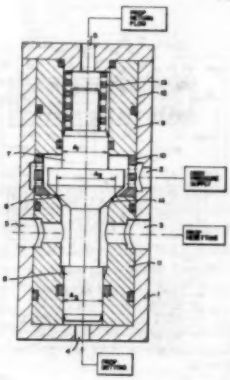
Karl Krieger, Wuppertal, and Werner Reinelt, Bochum, both of Fed. Rep. of Germany, assignors to Hermann Hemscheidt Maschinenfabrik GmbH & Co., Wuppertal, Fed. Rep. of Germany

Continuation of Ser. No. 765,232, Aug. 13, 1985, abandoned. This application Oct. 16, 1986, Ser. No. 920,926

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1984, 3430526

Int. Cl.[4] F01B *1/00*

U.S. Cl. 91—170 MP **1 Claim**



1. In combination, a control valve and prop conduits associated with the pressure chambers of the hydraulic props of a walking mine roof support assembly comprising:

a generally cylindrical valve housing, an elongate valve closure body arranged for longitudinal movement in the valve housing, a valve cone on an intermediate portion of the valve closure body, an annular valve seating arranged in the valve housing to be sealingly engaged by the valve cone with the valve closure body extending through the valve seating, a high pressure supply connected to said housing to communicate with valve cone, a valve closure spring in the valve housing arranged to act on one end portion of the valve closure body to press the valve cone into the valve setting, a first journal portion on the valve closure body on that side of the valve cone nearer the spring forming a first piston, a first cylinder in the valve housing slidingly and sealingly receiving the first piston for longitudinal movement therein, said first cylinder and said first journal portion forming a first chamber connected to the return flow conduit of a mine-roof prop, a second journal portion of the valve closure body on the side of the valve cone remote from the spring forming a second piston, and a second cylinder in the valve housing

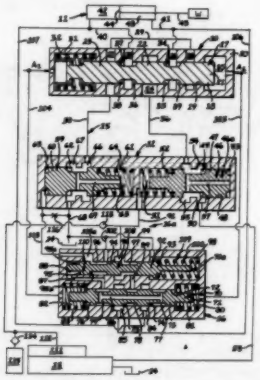
slidingly and sealingly receiving the second piston for longitudinal movement therein, said second cylinder and second journal portion forming a second chamber connected to a prop-setting conduit, the pistons having actuation areas of different sizes which are loadable by a pressure medium for the actuation of the closure body in dependence upon a predetermined minimum setting pressure in the pressure chambers of the props, the seal between the valve cone and the valve seating providing a sealing area of larger dimension than the actuation area on the first piston, the actuation area of the second piston having a smaller dimension than an annular area formed by the sealing area of the sealing cone and than the actuation area of the first piston, and the valve closure body with the valve cone and two pistons thereon being of one-piece construction.

4,694,731

LOAD COMPENSATED VALVE

Tadeusz Budzich, Moreland Hills, Ohio, assignor to Caterpillar Inc., Peoria, Ill.

Filed Dec. 22, 1986, Ser. No. 944,917
Int. Cl.[4] F15B *13/02*
U.S. Cl. 91—421 **18 Claims**



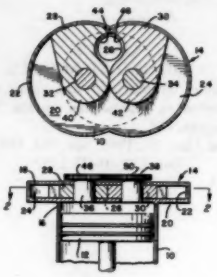
1. A load responsive valve assembly supplied with pressure fluid by a pump and operable to control fluid flow to and from a fluid actuator subjected to positive or negative load pressure said load responsive valve assembly comprising sensing means operable to determine whether said fluid actuator is subjected to positive or negative load pressure, first valve means having first and second fluid metering orifice means operably connected to said fluid actuator, inlet fluid control means interposed between said pump and said first fluid metering orifice means selectively operable to maintain a relatively constant pressure differential across said first metering orifice means, while the pressure upstream of said first metering orifice means is permitted to vary with said positive load pressure, and first deactivating means of said inlet fluid control means having means responsive to said negative load pressure above a certain predetermined negative load pressure level whereby said inlet fluid control means can selectively maintain fluid upstream of said first fluid metering orifice means at a relatively constant preselected pressure level when said negative load pressure exceeds said predetermined pressure level.

4,694,732

CLEARANCE POCKET ASSEMBLY

James V. Kursar, Horseheads, N.Y., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Mar. 31, 1986, Ser. No. 846,065
Int. Cl.[4] F01B *31/14*
U.S. Cl. 92—60.5 **8 Claims**



1. A clearance pocket assembly, for altering the effective volume of the cylinder of an air compressor or the like, comprising:

first means defining a shallow chamber having a center which is bounded by (a) a peripheral wall, and (b) a pair of parallel walls normal to, and joined by, said peripheral wall; wherein

one of said parallel walls has an aperture formed therein, said aperture being offset from said chamber center; and further including

second means within said chamber and movable, therewithin, between a first disposition for sealing off, from fluid communication with said aperture, at least a substantial portion of said chamber, and a second disposition for opening a substantial portion of said chamber to said aperture for fluid communication therewith; wherein

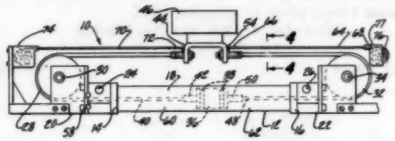
said second means comprises a rotor, journalled in said chamber, and haivng surfaces which form a constant, fluid-sealing interface with (a) said peripheral wall, and (b) both said parallel walls.

4,694,733

CABLE SHIELD FOR A RODLESS CYLINDER

Joseph H. Green, Dearborn, Mich., assignor to Greenco Corporation, Dearborn, Mich.

Filed Nov. 8, 1985, Ser. No. 796,416
Int. Cl.[4] F01B *29/00, 9/00*
U.S. Cl. 92—88 **18 Claims**



1. For use with a rodless cylinder of the type having an elongated cylinder, a fluid actuated piston longitudinally reciprocally mounted in said cylinder, an actuator, a movable member extending between one end of the actuator and one end of the piston, the improvement comprising:

an elongated flexible strip having a width greater than the width of said movable member,

means for attaching one end of said elongated strip to one end of said actuator, and

means longitudinally spaced from one end of said actuator

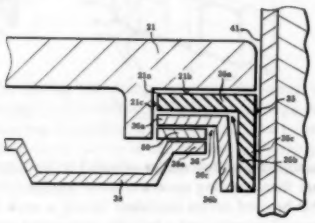
for longitudinally slidably receiving the other end of said strip, said longitudinal receiving means comprising means for winding said strip into a coil and being positioned so that said strip overlies said movable member.

4,694,734

SEALING CONSTRUCTION FOR SLIDE TYPE VACUUM PUMP WITH FINGER PORTIONS OF SPRING ELEMENT PRESSING CYLINDRICAL PORTION OF SEAL ELEMENT AGAINST CYLINDER BORE

Yoshihisa Nomura, Toyota; Koichi Suda, and Tadashi Kozawa, both of Oobu, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Aisan Kogyo Kabushiki Kaisha, both of, Japan

Filed Aug. 4, 1986, Ser. No. 892,282
Claims priority, application Japan, Aug. 9, 1985, 60-176493
Int. Cl.⁴ F16J 9/06
U.S. Cl. 92—130 R **6 Claims**



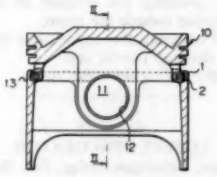
1. For a slide type vacuum pump, comprising:
(a) a cylinder bore; and
(b) a generally cylindrical piston member reciprocatingly slidably fitted in said cylinder bore;
(c) with a vacuum pumping chamber being defined on a one side of said piston member:
a sealing construction, comprising:
(d) a seal element housed in an annular groove shape formed around an axial end remote from said vacuum pumping chamber of said generally cylindrical piston member, said annular groove shape being defined by a generally flat annular first surface extending generally radially to said piston member and a generally cylindrical second surface extending generally axially to said piston member, said seal element comprising:
(d1) a generally flat annular first portion extending generally radially to said piston member, and axially abutted against said generally flat annular first defining surface of said annular groove shape; and:
(d2) a generally cylindrical second portion extending from the outer peripheral portion of said generally flat annular first portion of said seal element generally axially to said piston member in the same axial direction thereof as said generally cylindrical second defining surface of said annular groove shape and away from said vacuum pumping chamber, the outer cylindrical surface of said generally cylindrical second portion sliding against the inner cylindrical surface of said cylinder bore and sealing thereagainst;
(e) a first spring member, comprising:
(e1) a generally flat annular first portion extending generally radially to said piston member, and axially abutted against said generally flat annular first portion of said seal element and holding it against said generally flat annular first defining surface of said annular groove shape; and:
(e2) a plurality of resilient finger portions, each extending from the outer peripheral portion of said generally flat annular first portion of said first spring member generally axially to said piston member in the same axial direction thereof as said generally cylindrical second portion of said seal element and angled outwards somewhat when said first spring member is in the unstressed condition, and each said resilient finger portion springingly pressing against a portion of the inner cylindrical surface of said generally cylindrical second portion of said seal element and pressing said generally cylindrical second portion of said seal element in the radially outward direction against the inner cylindrical surface of said cylinder bore to effect sealing therebetween;
and:
(f) a second generally disk shaped spring member the outer peripheral portion of which resiliently presses in the axial direction on said generally flat annular first portion of said first spring member and axially biasing it against said generally flat annular first portion of said seal element and holding the two of them against said generally flat annular first defining surface of said annular groove shape.

4,694,735

PISTON FOR INTERNAL COMBUSTION ENGINE

Yoshiaki Tatematsu, and Atsuo Tanaka, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Sep. 10, 1985, Ser. No. 774,432
Claims priority, application Japan, Oct. 22, 1984, 59-220443
Int. Cl.⁴ F16J 1/04
U.S. Cl. 92—208 **6 Claims**



1. A piston for an internal-combustion engine, comprising a piston body made of aluminum or aluminum alloy, including a piston head portion, a piston skirt portion and a piston boss portion, provided with a composite fiber reinforcement consisting of a first layer of inorganic long filament, and a second layer or layers of inorganic staple short fibers substantially enclosing said first layer, said composite fiber reinforcement being arranged within the piston body, at least in either said piston boss or a shoulder portion of the piston skirt.

4,694,736

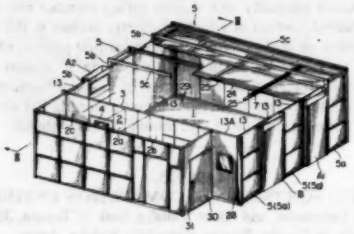
CLEAN ROOM

Taizo Yamagata; Takaaki Uchikawa; Shinichi Yamamoto; Shinichiro Tomikawa; Yoshio Ogasahara, and Masaru Sukagawa, all of Chuo, Japan, assignors to Shimizu Kensetsu Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1985, Ser. No. 790,308
Claims priority, application Japan, Oct. 23, 1984, 59-221320; Feb. 26, 1985, 60-35286
Int. Cl.⁴ F24F 1/02
U.S. Cl. 98—31.6 **4 Claims**

1. A clean room for keeping clean interior air of an airtight main room by circulating the interior air through a circulation path and an air conditioner and filters disposed in the circulation path, which clean room comprises:
a plurality of gate-shaped frames disposed in prescribed directions and regularly spaced on a floor surface;
an air-conditioning unit built in at least one of the spaces between the adjacent vertical members of the gate-shaped frames
a control unit built in one of the spaces between the adjacent vertical members other than the space occupied by the air-conditioning unit and adapted for controlling the air-conditioning unit, the air-conditioning unit being provided

with an external casing of low thickness, the external casing having at the lower interior wall thereof an air inlet and at the upper interior wall thereof an air outlet fitted with a high-performance filter, the casing having therein an air blower, the air-blower being so adapted as to deliver forced air flow to the air outlet, and the control unit being disposed in a thin external casing for accommodating mechanical control items;



wall panels covering the spaces between the adjacent vertical members of the gate-shaped frames other than those occupied by the air-conditioning unit and the spaces between the vertical members of the gate-shaped frames and wall panels covering the exterior of the gate-shaped frames positioned outside the room;

a ceiling panel covering the upper open end of the room enclosed by the wall panels; and

means for tightly sealing the clean room.

4,694,737

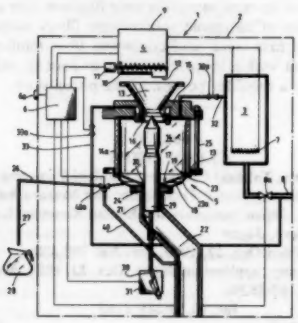
COFFEE PERCOLATOR

Gerhard Wittlinger, Geislingen/Steige, Fed. Rep. of Germany, assignor to Wuerttembergische Metallwarenfabrik AG, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,832

Int. Cl.[4] A47J *31/06*

U.S. Cl. 99—279 **7 Claims**



1. A coffee percolator comprising a scalding chamber and a coffee filter including a wall substantially closing said scalding chamber at its lower portion and extending from an upper peripheral rim in a conical configuration with an angle of about 8° to 35° to the horizontal towards a substantially centrally located outlet, said wall comprising a support sieve and a sheet of stainless steel disposed on the upper surface of said support sieve facing towards said scalding chamber, said sheet having a thickness of about 20 to 80 μm and being provided with a pattern of etched micro-perforations having a diameter of about 30 to 100 μm at the surface facing towards said scalding chamber and wherein the diameter of substantially all of said micro-perforations of said sheet increases from the upper side thereof facing towards said scalding chamber in the direction of the lower side facing towards said support sieve, said support sieve having a thickness of about 0.5 to 3 mm and being provided with a pattern of holes having a diameter of about 1 to 5 mm.

4,694,738

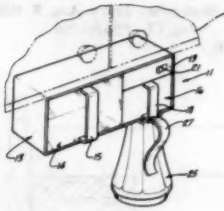
AUTOMATIC DRIP COFFEE MAKER

Richard A. Tarozzi, Gales Ferry, Conn., assignor to King-Seeley Thermos Co., Del.

Filed Jan. 14, 1986, Ser. No. 818,771

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—279 **12 Claims**



1. An automatic coffee maker adapted to be supported by means other than standing upon a counter top for delivery into a removable brewed coffee container having a neck defining a fill and pouring opening and a base for supporting said serving container on a table or the like comprising a main housing, a water compartment carried by said main housing and adapted to hold an amount of water, heating means for heating the water from said water compartment, a filter compartment carried by said main housing and adapted to contain coffee, means for communicating heated water from said heating means to said filter compartment, said filter compartment having a brewed coffee outlet for discharging liquid brewed coffee, and container supporting means carried by said housing and adapted to detachably support a brewed coffee container other than by its base and with its mouth adapted to receive the brewed coffee from said filter compartment.

4,694,739

APPARATUS FOR BEVERAGE BREWING

Joseph W. Daintrey, Royston, and Peter Thomson, Cambridge, both of England, assignors to Sankey Vending Limited, Bilston, England

PCT No. PCT/GB85/00375, § 371 Date Apr. 3, 1986, § 102(e) Date Apr. 3, 1986, PCT Pub. No. WO86/01388, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 21, 1985, Ser. No. 852,249

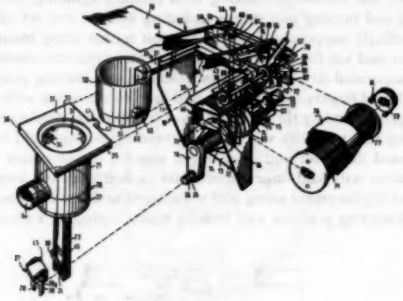
Claims priority, application United Kingdom, Aug. 25, 1984, 8421674

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—289 R **4 Claims**

1. Apparatus for producing, during a cycle, an infusion from a liquid and an infusible ingredient, and comprising: a container for receiving the ingredient and liquid; a base of the container which is permeable to air and liquid but substantially impermeable to the ingredient; means to move the container between an operative position in which it is sealed to the base and an inoperative positon in which it is spaced from the base; a piston and cylinder assembly under the container; the cyliner having an open top which communicates with the base; a support; a pair of arms on the support to receive the cylinder therebetween; a flange on the cylinder; mutually interengageable surfaces on each arm and the flange, such surfaces extending generally perpendicular to the longitudinal axis of the cylinder; means for reciprocating the piston in the cylinder when the

container is in its operative position; said reciprocating means comprising: a connecting rod between the piston, a rotatable crank and a detachable connection between said rod and the crank; the piston and cylinder assembly being mountable on and demountable from the support when said connection is



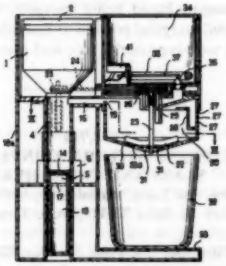
detached by sliding the flange between the arms with said surfaces engaged; an outlet in the cylinder through which the infusion entering the cylinder via the base can be delivered; and operating means to cycle the apparatus by reciprocating the piston and moving the container between its operative and inoperative positions.

4,694,740

DOMESTIC APPLIANCE USING A HYDROPHILIC POWDER

Joanny Daloz, Is Sur Tille, France, assignor to SEB S.A., Selongey, France

Filed Mar. 27, 1986, Ser. No. 844,782
Claims priority, application France, Apr. 3, 1985, 85 05084
Int. Cl.[4] A23F *3/00*; A47J *31/00*
U.S. Cl. 99—323.3 **10 Claims**



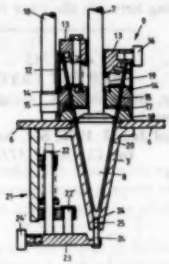
1. A domestic appliance for preparing a drink from a soluble powder and a liquid, comprising a chamber **(4)** for dispensing said powder in a quantity according to the volume of drink required to be prepared, a chamber **(20)** for mixing said powder with the liquid, said chambers communicating with one another via a duct **(16)** connecting the top parts of said chambers, a turbine **(7)** driven by a motor **(9)** to create a current of air between the base of the dispensing chamber **(4)** and an opening **(15)** leading into said duct **(16)**, the base of said chamber having means **(14)** to prevent the passage of powder while being permeable to the current of air.

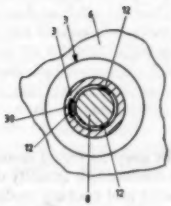
4,694,741

APPARATUS FOR MAKING ROLLED WAFER CONES

Franz Haas, Sr., Vienna; Franz Haas, Jr., Leobendorf, and Johann Haas, Klosterneuburg, all of Austria, assignors to Franz Haas Waffelmaschinen Industriegesellschaft m.b.H., Vienna, Austria

Division of Ser. No. 727,006, Apr. 25, 1985, Pat. No. 4,624,885.
This application Sep. 8, 1986, Ser. No. 904,898
Claims priority, application Austria, May 4, 1984, 1491/84
Int. Cl.[4] A21C *15/02*; A21D *13/00*
U.S. Cl. 99—354 **48 Claims**





1. Apparatus for making a rolled wafer cone having an annular cone rim and a closed cone tip, which comprises

(a) wafer-baking oven for baking a plastically deformable, flat wafer blank of a sugar-containing dough, the blank having a circumferentially extending rim and the oven having a delivery station for the baked flat wafer blank, and

(b) a rolling apparatus having a blank-receiving station facing the oven delivery station for receiving the baked flat wafer blank to be rolled into the wafer cone and a rolling apparatus delivery station for delivering the rolled wafer cone, the rolling apparatus comprising:

(1) a rotary frame rotatable about an axis and having a circumference surrounding the axis, and

(2) a plurality of winding devices spaced from each other along the circumference of the frame and mounted thereon for rotation therewith between the blank-receiving and delivery stations of the rolling apparatus, each winding device comprising:

(i) a winding mold having a conical inside surface defining a conical cavity having a longitudinal axis, a wide open end and a narrow end opposite thereto, the winding mold having a slot for introducing the baked flat wafer blank into the conical cavity,

(ii) a rotatable winding shaft extending coaxially with the longitudinal winding mold cavity axis and parallel to the rotary frame axis, the winding shaft being axially displaceable and having an end facing the winding mold,

(iii) a conical winding core secured to the winding shaft end for rotation therwith and movable into the conical winding mold cavity upon axial displacement of

the winding shaft whereby the conical inside surfaces of the winding mold and the conical winding core define a gap receiving the plastically deformable, flat baked wafer blank through the slot in the winding mold for rolling the wafer blank into the wafer cone upon rotation of the winding shaft and winding core secured thereto while the rim of the blank remains unrestrained and a portion of the unrestrained blank rim forms the cone rim, and

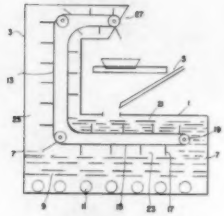
(iv) a sizing device for plastically deforming the cone rim of the rolled wafer cone until it has an accurately defined annular rim and an accurately defined length extending between the cone rim and cone tip.

4,694,742

DEEP FAT FRYER

Jerome J. Dover, Blackfoot, Id., assignor to Basic American Foods, San Francisco, Calif.

Filed Jan. 3, 1986, Ser. No. 815,913
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—404 **4 Claims**



1. An apparatus for deep fat frying comestibles comprising:

(a) a reservoir for containing a quantity of cooking medium;

(b) means for heating said cooking medium;

(c) means for conveying comestibles through said cooking medium, said means for conveying having:

(i) a first section horizontally disposed for receiving said comestibles and conveying said comestibles horizontally for a prescribed distance in order to permit a second batch of comestibles to be supplied to said apparatus;

(ii) a second section adjacent said first section, said second section being curved for conveying comestibles downwardly to submerge said comestibles in said cooking medium;

(iii) a third section horizontally disposed adjacent said second section and located directly below said first section for transporting said submerged comestibles through the cooking medium for a prescribed period of time;

(iv) a fourth section vertically disposed adjacent said second section for removing the comestibles from the cooking medium and permitting the comestibles to drain free of excess cooking medium; and

(v) a fifth section adjacent said fourth section and horizontally disposed above said first section for conveying the cooked and drained comestibles to a discharge area located above and adjacent to the area of introduction of food product into said first section.

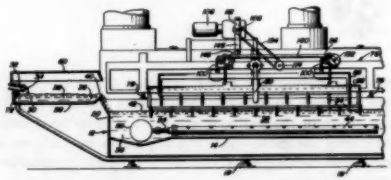
4,694,743

METHOD AND APPARATUS FOR FRYING PRODUCT

Horace E. Groff, Box 176, School Rd., Bowmansville, Pa. 17507

Filed Nov. 25, 1985, Ser. No. 802,164
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—405 **11 Claims**

1. An apparatus for frying a food product, said apparatus including an elongated cooking vat, heated cooking liquid disposed within said vat to a predetermined level and upon which said product will float, heating means in good heat transfer relation with said liquid for supplying heat energy thereto at a controlled rate, food product supply means for applying food product to one end of said vat at a controlled rate, product discharge means operatively associated with the other end of said vat for discharging cooked product therefrom, and combined cooking food product agitating, propelling and turning unit means including at least one set of dependingly supported fingers, said unit means being mounted from said vat for cyclic movement relative thereto consisting of sequential downward displacement from a starting position with said fingers spaced above said level to a position with said fingers extending through said level, longitudinal displacement along said vat, with said fingers extending through said level, toward the other end of said vat, upward displacement to a position with said fingers spaced above said level and longitudinal displacement along said vat toward said one end back to said starting position, said heating means including a plurality



of laterally spaced longitudinally extending cylindrical heat tubes disposed within said vat below said predetermined level, each of said heat tubes including burner means in an end thereof adjacent said other end of said vat and combustion exhaust manifold means in said one end of said vat into which the adjacent ends of said tubes open, said vat including cooking liquid circulating means including pumping means for pumping a portion of said cooking liquid from said other end of said vat and discharging the pumped cooking liquid into said one end of said vat, an initial product receiving tank disposed adjacent said one end of said vat and including one marginal portion of said tank defining a weir-type outlet for discharging liquid from said tank into said one end of said vat, said tank including a second marginal portion opposite said one marginal portion into which said pumping means discharges the pumped liquid, the pumped liquid being movable through said tank from said second marginal portion to said one marginal portion and over said weir-type outlet into said one end of said vat.

4,694,744

HYDRAULIC PRESS WITHOUT CONVENTIONAL SIDE SLABS AND CROSS-HEAD

James Hepburn, and Leon Malashenko, both of Toronto, Canada, assignors to John T. Hepburn, Limited, Mississauga, Canada

Filed Oct. 30, 1986, Ser. No. 924,927
Claims priority, application Canada, Dec. 30, 1985, 498799
Int. Cl.[4] B30B *7/02*
U.S. Cl. 100—214 **9 Claims**

1. A press comprising:

a base structure which includes a lower platen;

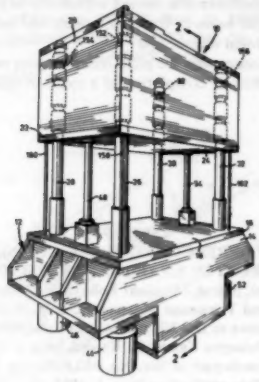
a multiplicity of vertical posts;

guide means attached to the base structure and continually engaged with the posts for rigidly guiding the posts to move vertically relative to the base structure;

hydraulic cylinder means attached to the base structure for raising and lowering the posts;

an upper platen guided solely on the posts for vertical movement relative to the lower platen;

upper platen displacement means for moving the upper platen relative to the posts; and,



controllable locking means for releasably locking the upper platen to the vertical posts.

4,694,745

PRINTED BAND, IN PARTICULAR FOR PRICE MARKING DEVICES

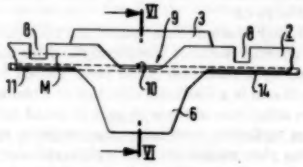
Heinrich Volk, Beerfelden-Gammelsbach; Karl Harter, and Fritz Dotter, both of Furtwangen, all of Fed. Rep. of Germany, assignors to Esselte Meto International GmbH, Fed. Rep. of Germany

Filed Jun. 13, 1985, Ser. No. 744,229

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1984, 3422456

Int. Cl.[4] B41J *1/60*

U.S. Cl. 101—111 **13 Claims**



1. In a printing band, in particular for price marking devices, which is endless and has one run (2) which on its outer side comprises visually readable characters (3) or digits and which on the opposite run (4) has printable characters (5) or digits disposed laterally inverted relative to the visually readable characters, and respective inwardly projecting cams causing an increase in thickness of belt in the location of the cams disposed beneath the readable characters (3), said cams being used to advance the printing band (1), the inner side (11) of the run of the printing band which carries the printable characters (5) being smooth and a first recess (8) between each adjacent printable and readable character, said first recesses (8) extending from the outside inwardly to provide for selective band weakening areas,

the improvement comprising means for increasing the flexibility of the printing band at the location of the cams, said means for increasing the flexibility including a second recess (9) aligned with each of the inwardly projecting cams (6) on the outer side of the run (2) which is remote from the cams (6).

4,694,746

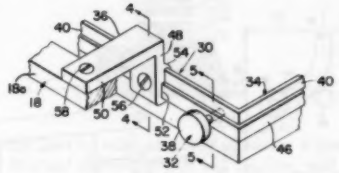
SILKSCREEN FRAME MOUNTING ASSEMBLY FOR PRESS

Kaino J. Hamu, 25142 Wandering La., El Toro, Calif. 92630

Continuation of Ser. No. 657,832, Oct. 5, 1984, abandoned. This application Jul. 22, 1986, Ser. No. 889,582

Int. Cl.[4] B41F *15/36*

U.S. Cl. 101—124 **7 Claims**



1. A mounting assembly for removably mounting a stencil screen frame on the screen frame support of a stencil screen printing press between spaced members of the frame support, comprising:

an open rectangular carrier frame to be positioned between said support members of said printing press for receiving said screen frame through one side of the carrier frame, said carrier frame having sidewalls along the edges of the carrier frame substantially normal to the plane of the carrier frame and flanges projecting inwardly from said sidewalls along the sidewall edges at the opposite side of said carrier frame and disposed in a common plane generally parallel to said plane of the carrier frame, said opposite side of said carrier frame having an opening bounded circumferentially by said flanges,

said carrier frame being adapted to receive said screen frame in a position wherein said screen frame rests on said flanges,

screws threaded in said carrier frame sidewalls with their axes substantially parallel to said plane of the carrier frame for engaging the edges of a screen frame positioned in the carrier frame to releasibly secure the screen frame in the carrier frame, and

mounting brackets rigidly joined to two opposite side walls of said carrier frame for mounting said carrier frame on said screen frame support of the printing press, said mounting brackets including arms extending outwardly from said opposite sidewalls in opposite edgewise directions of said carrier frame and in a common plane substantially parallel to said plane of said carrier frame flanges and offset from the latter plane toward said one side of said carrier frame for engagement over said screen frame support members of said printing press.

4,694,747

PRINT HEAD OPERATING MECHANISM

Alfred A. Marozzi, 3 Cheryl Rd., Pine Brook, N.J. 07058

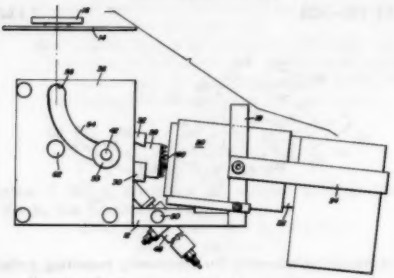
Filed Apr. 15, 1981, Ser. No. 254,396

Int. Cl.[4] B41F *1/04*

U.S. Cl. 101—301 **11 Claims**

10. In an apparatus for intermittently marking a substantially planar surface, including a frame, an elongated ink storage cartridge having an inclined longitudinal axis, an ink transferring end portion and an ink pad at said end portion with a surface substantially perpendicular to the axis, a print head mounted on the frame for movement independently of the cartridge, and a power operated device pivotally connected to the print head at a movable pivot for displacement thereof between marking and inking positions respectively engaging the planar surface and the surface of the ink pad in the end portion of the cartridge, the improvement comprising means mounting the cartridge on the frame for fixing said inclined axis thereof to the frame, means for guiding movement of the

movable pivot along an arcuate path having a substantially constant radius of curvature and opposite terminal ends, and orienting means engageable with the print head at a second pivot fixed to the frame for angularly displacing the print head about said movable pivot in response to said movement along



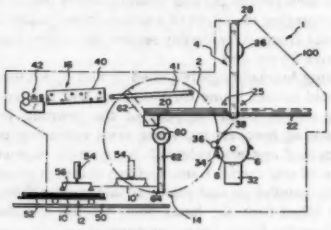
the arcuate path between said inking and marking positions, said opposite terminal ends of the arcuate path lying on tangents thereto which intersect at the fixed pivot, one of the said tangents being coincident with the fixed inclined longitudinal axis of the cartridge.

4,694,748

DEVICE FOR MOVING OFFSET PLATES

Kunio Fujisawa, Saitama; Toyoji Tanaka, Tokyo; Toshio Mochizuki, Saitama; Norio Nakamura, Saitama, and Seiji Kaya, Saitama, all of Japan, assignors to Fujirex Company, Limited, Japan

Filed Nov. 14, 1985, Ser. No. 798,179
Int. Cl.[4] B41C *1/02*
U.S. Cl. 101—401.1 **8 Claims**



1. Printing and fixing apparatus for forming an image on offset plates comprising a support for a stack of said offset plates, a photo-printing device and a photo-fixing device; said offset plates initially having no discernible image when in said stack;

said apparatus being operable in connection with offset plates having a plurality of holes adjacent one edge thereof; said offset plates forming said stack and being arranged with the holes in said plates aligned with each other;

operating means for moving said plates in a cycle of operation individually and successively from said stack to said photo-printing device and then to said photo-fixing device;

said operating means comprising a transport member; one end of said transport member being translatable in a rotary path from said stack to said photo printing device to said photo-fixing device; said photo-printing device and said photo-fixing device forming a discernible image on each plate;

additional means for engaging and raising the top offset plate of said stack towards said transport member;

a pin fixing plate carried tangentially at the one end of said transport member and having a plurality of pins registrable with the holes in the plate which has been raised by said additional means; and

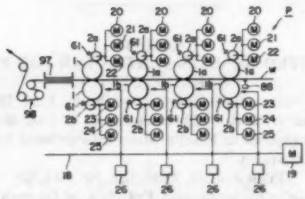
means for disengaging the plate from the pins and the transport member on completion of a cycle of operation.

4,694,749

METHOD OF PRESETTING PLATE CYLINDERS FOR REGISTERING IN AN OFFSET PRINTING PRESS

Hideo Takeuchi, Shiroi; Michiaki Kobayashi, Kitamoto; Osamu Yoritsune, and Takemasa Matsumoto, both of Mihara, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha and Mitsubishi Jukogyo Kabushiki Kaisha, both of Tokyo, Japan

Continuation-in-part of Ser. No. 653,840, Sep. 24, 1984, abandoned. This application Nov. 1, 1985, Ser. No. 793,790
Claims priority, application Japan, Sep. 30, 1983, 58-182315
Int. Cl.[4] B41F *5/06, 13/12*
U.S. Cl. 101—426 **3 Claims**



1. A method of presetting plate cylinders for registering before the start of a printing operation in an offset printing press in which a web runs between surfaces of opposed rotating blanket cylinders for the plate cylinders, the method comprising the steps of:

(a) correcting rotation phase, lateral and twist errors of each plate cylinder without considering a delamination error defined by a rotational phase error caused by the web being drawn in a rotational direction of a blanket cylinder due to adherence of the web onto an inked surface of the blanket cylinder, while detecting register marks on a printing plate mounted on each plate cylinder;

(b) calculating tension of a web on the basis of a functional expression with respect to at least one of width and weight per unit length of the web and operating tension adjusting means on the basis of a calculated value of web tension;

(c) calculating the delamination error of each plate cylinder corresponding to each printing color on the basis of at least one functional expression with respect to at least one of the calculated tension, width, weight per unit length and rates of pattern area and operating delamination error correcting means on the basis of a calculated value of a delamination error with respect to each plate cylinder corresponding to each printing color; and

(d) carrying out self-learning in which an operator manually adjusts the delamination error correcting means until delamination errors are eliminated while viewing shear of colors on printed articles to determine a suitable web tension and delamination error when shear of colors is eliminated, the suitable web tension and delamination error being used when coefficients of the functional expressions with respect to web tensions and delimination errors are calculated for subsequent printing operations.

4,694,750

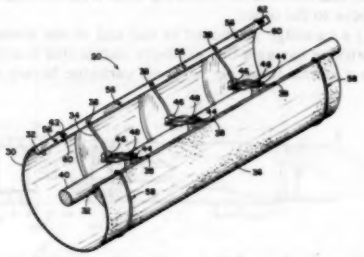
PRINTING PRESS CYLINDER WITH AXIALLY ADJUSTABLE CORD ANTI-SMEAR DEVICES

Joe A. Greene, 3176 South 76 East Ave., Tulsa, Okla. 74145

Continuation of Ser. No. 800,560, Nov. 21, 1985, abandoned. This application Jan. 15, 1987, Ser. No. 5,323

Int. Cl.[4] B41F *21/00*

U.S. Cl. 101—426 **16 Claims**



1. A method for preventing the smearing on ink of a freshly inked sheet of paper as it moves through a printing press, comprising the steps of:

providing a printing press having a blanket cylinder, an impression cylinder, and a transfer cylinder,

providing the transfer cylinder with a cylindrical portion,

providing the cylindrical portion of the transfer cylinder with an axially oriented flange at each axial end thereof,

providing a pair of elastic members, each elastic member having a hook each end there of,

attaching each elastic member to the cylindrical portion by securing each hook cooperably with each flange and stretching each elastic member around the circumferential surface of the circular portion,

examining properties of material to be printed so as to choose a position along the flange members for the elastic members to provide an efficient antismearing capacity for the transfer cylinder, and

adjusting the elastic members axially along the flange members to chosen positions for the elastic members around the cylindrical portion so as to provide a minimum area of contact of the elastic members with printed areas of the freshly inked sheet.

4,694,751

EXPLOSIVE SYSTEM FOR GUIDED MISSILES AND ROCKET PROJECTILES

Horst Moosmann, Schramberg, Fed. Rep. of Germany, assignor to Gebruder Junghans GmbH, Schramberg, Fed. Rep. of Germany

Filed Nov. 13, 1985, Ser. No. 797,489

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1984, 3441385

Int. Cl.[4] F42C *19/08*

U.S. Cl. 102—202 **2 Claims**

1. An explosive system for use in projectiles such as guided missiles and rocket projectiles, comprising:

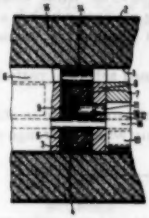
an explosive charge,

an ignition booster for igniting said charge, said booster arranged within said charge such that an outer circumference of said booster is encompassed by said explosive charge, said booster defining a longitudinal axis,

a detonator spaced longitudinally from said booster for igniting said booster,

a layer of material disposed between said booster and said detonator, and

an ignition transfer device arranged between said detonator and said booster for being ignited by said detonator and igniting said booster, said ignition transfer device including a first portion embedded longitudinally within said booster, a second portion extending through said layer of



material, and an enlarged collar located at a junction of said first and second portions and engaging said booster and said layer of material.

4,694,752

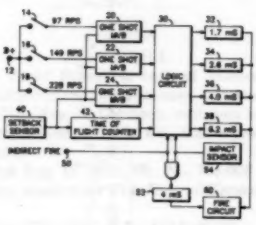
FUZE ACTUATING METHOD HAVING AN ADAPTIVE TIME DELAY

John D. Titus, Phoenix, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 2, 1986, Ser. No. 914,405

Int. Cl.[4] F42C *11/06, 15/40*

U.S. Cl. 102—215 **3 Claims**



1. A method of adaptive delay after impact of projectile comprising the steps of:

determining a spin rate of a projectile;

setting a time delay corresponding with said spin rate;

updating said time delay; and

starting said time delay after impact.

4,694,753

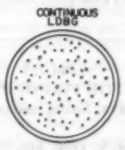
CONTINUOUS PRODUCTION OF LOW DENSITY BASE GRAIN WITH A SALT-FREE LIQUOR

Karen A. Thomas, Leon, Fla., assignor to Olin Corporation, Stamford, Conn.

Filed Feb. 26, 1986, Ser. No. 834,182

Int. Cl.[4] C06D *5/06*

U.S. Cl. 102—289 **3 Claims**



1. In the art of making spherical, single-base low density powder grains from discrete particles of a lacquer of a single

smokeless powder base and a solvent therefore, the method comprising the steps of

(a) continuously forming a single-base lacquer into substantially spherical particles while entrained in a salt-free liquor suspending medium which is a non-solvent for the powder base and substantially immiscible with said solvent,

(b) coating the formed spherical particles with a deterrent; and

(c) rolling the particles to produce an oblate spheroidal grain of a specific gravity within the range of from about 1.15 to about 1.275.

4,694,754

MULTI-PHASE CHARGE HOLDER

Jack E. Dines, and Ernest L. Gillingham, both of Fort Worth, Tex., assignors to Jet Research Inc., Arlington, Tex.

Filed Apr. 21, 1986, Ser. No. 854,277
Int. Cl.[4] F42B *1/02*
U.S. Cl. 102—310 **18 Claims**

1. A shaped charge carrier assembly apparatus, comprising:

a carrier including:

a plurality of carrier segments integrally formed from a single substantially flat elongated sheet of structural material; an interconnecting portion located between and integrally connected with each two adjacent carrier segments;

said interconnecting portion being defined at least partially by first and second transverse slot extending from opposite edges of said elongated carrier toward a longitudinal central axis of said elongated carrier; and

said adjacent carrier segments being angularly offset from each other about said longitudinal axis by permanent deformation of said interconnecting portion located therebetween; and

a plurality of shaped charges connected to said plurality of carrier segments.

4,694,755

SHELL FOR FIRING PRACTICE

Inigo A. Ibarra, Vizcaya, Spain, assignor to Esperanza y Cia, S.A., Spain

Filed Apr. 9, 1986, Ser. No. 849,751
Int. Cl.[4] F42B *13/22*
U.S. Cl. 102—445 **10 Claims**

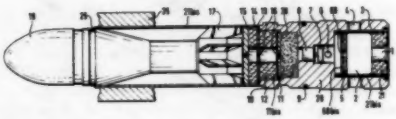
1. A shell for firing practice comprising:

(a) a master projectile in the shape of a conventional shell, said master projectile having a bore along the longitudinal axis of said master projectile;

(b) a subcaliber training projectile, said subcaliber trainign projectile comprised of a sleeve and a plurality of components that are housed in said sleeve, said subcaliber training projectile capable of fitting inside said master projection bore;

(b_1)said sleeve housing said components such that said components are concentrically placed in axial continuity inside said sleeve in the following order from one end of said sleeve to the other;

(b_{1-1}) a cartridge positioned at one end of the sleeve said cartridge having a first explosive charge that is activated by a mortar firing pin, and said cartridge having a wad



with at least one hole therethrough, said first explosive charge capable of producing a first explosion;

(b_{1-2}) a second firing pin positioned next to said cartridge inside said sleeve, said second firing pin capable of being acted upon by said first explosion by means of said hole in said wad;

(b_{1-3}) a second explosive charge which is capable of being activated by said second firing pin, said second explosive charge capable of producing a second explosion;

(b_{1-4}) means for transmitting the second explosion;

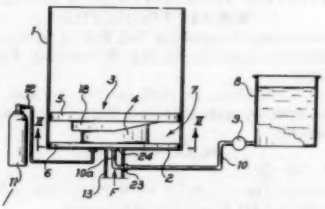
(b_{1-5}) a carried projectile positioned at the other end of said sleeve, said second explosion acting on said carried projectile by means to transmit the second explosion thereby igniting a third explosive charge in said carried projectile.

4,694,756

FURNACE FOR THE COMPLETE, SMOKELESS COMBUSTION OF LIQUID OR PARTIALLY LIQUID MATERIALS

Giuseppe Carrara, Via Cavour, 125, Cernusco Sul Naviglio, Italy

Filed Jul. 21, 1986, Ser. No. 887,221
Claims priority, application Italy, Jul. 31, 1985, 21784 A/85
Int. Cl.[4] F23G *7/04*
U.S. Cl. 110—238 **7 Claims**

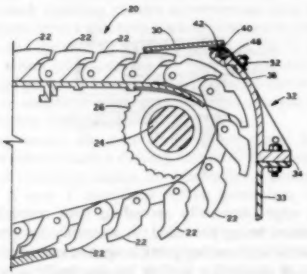


1. A furnace for complete smokeless combustion of liquid or partially liquid materials, wherein it includes, at the lower end of a hollow cylindrical body open at the top thereof, a cylindrical body provided, at the opposite ends thereof, with expanded portions, said expanded portions together with the side surface of cylindrical body and the opposite internal surface of hollow cylindrical body, enclosing a combustion chamber wherein there is injected the materials to be burnt, a fuel gas and a combustion sustaining gas, by means of suitable passages provided inside cylindrical body, said passages being connected for that purpose to sources of supply of said products.

4,694,757
TUYERE CONSTRUCTION FOR REFUSE BURNING BOILER SYSTEMS

Richard A. Hawkins, Columbus, and Merle D. Hunter, Orient, both of Ohio, assignors to The City of Columbus, Ohio, Columbus, Ohio

Filed Apr. 30, 1986, Ser. No. 857,492
Int. Cl.[4] F23H *11/10*
U.S. Cl. 110—271 **3 Claims**



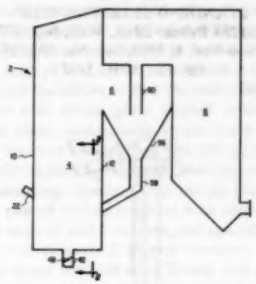
1. An improved tuyere assembly for a refuse burning boiler of the kind having a conventional continuously moving stoker grate defining a path of travel for refuse from a rear wall to a forward wall of said boiler comprising, in combination, a tuyere support wall disposed adjacent to said rear wall of said boiler and spaced near to the rear of said stoker grate, said support wall having an arcuate upper portion extending above a portion of the path of travel and laterally across said stoker grate generally at a right angle to said path of travel; a plurality of tuyere plates horizontally disposed in closely adjacent relationship to one another and extending laterally across a portion of the path of travel of said stoker grate, said plates being independently mounted at their rearwardly disposed edge to said support wall for vertical pivoting movement about a substantially constant horizontal axis with their forwardly disposed edge freely engaging the moving upper surface of said stoker grate and means fixed to said support wall to limit the angle of the vertically upward pivoting movement of any one of said plates independent from another to an angle less than ninety degrees, whereby vertically raised foreign obstructions which adhere upon the surface of said stoker grate during combustion may pass under said tuyere plates by forcing said plates to pivot vertically away from said stoker grate.

4,694,758
SEGMENTED FLUIDIZED BED COMBUSTION METHOD

Walter P. Gorzegno, Morristown, and Iqbal F. Abdulally, Randolph, both of N.J., assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Dec. 16, 1986, Ser. No. 942,126
Int. Cl.[4] F23D *1/00*
U.S. Cl. 110—347 **4 Claims**

1. A method of generating heat comprising the steps of:
forming a plurality of chambers in an enclosure,
introducing a particulate fuel material into one of said chambers,
introducing air into said one chamber to form a fluidized bed of said particulate material in said one chamber,
controlling the velocity of said air so that it is substantially equal to the minimum velocity required to fluidize said bed,
introducing a particulate fuel material into another of said chambers,
introducing air into said other chamber to form a fluidized bed of said particulate material in said other chamber,
controlling the velocity of said air introduced to said other chamber so that it is substantially equal to the minimum velocity required to fluidized said bed in said other chamber,
then increasing the velocity of air introduced to at least one of said chambers to a value above said minimum velocity and so that it combines with the gaseous products of

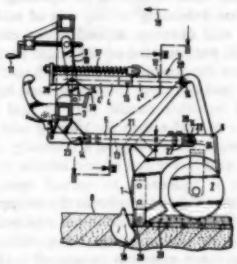


combustion and entrains a portion of said particulate material,
separating the entrained particulate material from said mixture of air and gaseous products of combustion, and
passing said separated particulate material into one of said chambers.

4,694,759
SEED DRILL

Heinz Dreyer; Bernd Scheufler, both of Hasbergen; Benno Wiemeyer, Lotte-Halen, and Johannes Lührmann, Wallenhorst, all of Fed. Rep. of Germany, assignors to Amazonen Werke H. Dreyer GmbH & Co. KG, Hasbergen-Gaste, Fed. Rep. of Germany

Filed Aug. 15, 1985, Ser. No. 766,000
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1984, 3431327
Int. Cl.[4] A01C *7/20*; A01B *49/06*
U.S. Cl. 111—85 **17 Claims**



1. In a seed drill movable in a direction of travel for applying at least one of seed and fertilizer, having a frame, reservoir, sowing shares, and means attaching each sowing share to the frame to enable the sowing share to move in an upright plane parallel to the direction of travel including a parallelogram mount with superimposed and at least approximately parallel upper and lower struts, the improvement wherein the attaching means further comprises: the upper strut having a longitudinal axis parallel to the direction of travel when in the horizontal working position, the lower strut having a narrow side and being inherently elastic and comprising spaced apart leaf springs, wherein the lower strut has connection means mounting a sowing share, the connection means including an axis

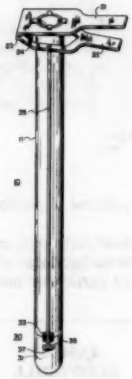
extending transverse to the direction of travel and including an intermediary fastened to the leaf spring and to a bushing mounted on the intermediary and which is wider by a multiple of the narrow side of the lower strut and means including said elastic lower strut enabling the sowing share to deflect laterally about the longitudinal axis of the upper strut.

4,694,760

STANDING SEED PLANTER

Joan A. Camp, 1798 Belmar Blvd., Wall, N.J. 07719

Filed Nov. 1, 1985, Ser. No. 793,751
Int. Cl.[4] A01C *5/02*
U.S. Cl. 111—92 **3 Claims**



1. A seed planter for gardening from an upright position comprising an elongated, hollow, tubular body having an open upper end and a lower end; means for closing said lower end; said means for closing said lower end being pointed for insertion into the ground; said means for closing said lower end having at least one movable portion controlled by a lever rigidly mounted on said portion, said portion being hinged to open said lower end when said lever is moved; a handle means having a rigid part secured around the opening, and including a grasping portion extending to one side of said opening and not obstructing said opening, at said upper end; said handle having a movable part pivoted on said rigid part, extending to said one side from the opposite side beneath said rigid part and not obstructing said opening, to be squeezed by hand; means connecting said movable handle part to said lever on said movable portion of said means for closing said lower end to maintain said means for closing in a normally closed portion and for opening said lower end of said tubular body when said movable handle is squeezed, to spread open said ground pierced by said pointed end to permit the dropping of a given seed through said opening at said upper end and through said hollow tubular body, for planting, along with water to start germination, and other materials to nourish said seed.

4,694,761

YARN CUTTING HEAD

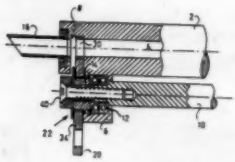
Yackob Golda, 5 Noga Street, Herzlia, Israel

Filed Dec. 23, 1986, Ser. No. 945,787
Claims priority, application Israel, Jan. 6, 1986, 77530
Int. Cl.[4] D05C *15/06*
U.S. Cl. 112—80.71 **6 Claims**

1. A yarn cutting head for a tufting machine, comprising:

a discoid, rigid cutting plate having a central bore for the free passage therethrough of a first element of said machine, means for rigid attachment of said plate to a second element of said machine, and at least one cutting hole eccentrically located relative to said bore and substantially concentric, in the attached state of said cutting plate, with a yarn-feeding duct provided in said second member of the machine;

a revolving cutting knife made of a relatively thin, elastically flexible material, drivable by a motor of said tufting machine via a drive shaft and consisting of a hub portion provided with a hole for connection to said drive shaft, and an elongated cutting portion extending beyond said hub portion, said cutting portion being provided with a



cutting edge outwardly extending with respect to said hole, means being provided, in assembly for pressing at least part of said cutting portion against said cutting plate,

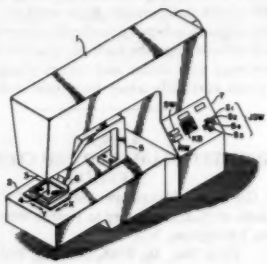
wherein said elastically flexible cutting knife is prebent in such a way that when upon assembly, the rear face of said hub portion is pressed against said cutting plate said elongated cutting portion is pressed against said plate along a relatively narrow strip only, said strip including said cutting edge.

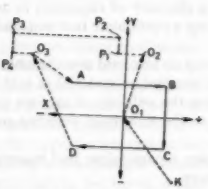
4,694,762

SEWING MACHINE CONTROL APPARATUS

Kunio Takano, Tokyo, and Masanori Nukushina, Kanagawa, both of Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

PCT No. PCT/JP84/00543, § 371 Date Aug. 7, 1985, § 102(e) Date Aug. 7, 1985, PCT Pub. No. WO85/02871, PCT Pub. Date Jul. 4, 1985
PCT Filed Nov. 13, 1984, Ser. No. 767,292
Claims priority, application Japan, Dec. 26, 1983, 58-246833
Int. Cl.[4] D05B *21/00*
U.S. Cl. 112—121.12 **1 Claim**





1. In a sewing machine including a needle rod having a

needle secured to a lower end thereof and movable up and down directions in operative association with a main shaft, a moving body having a fabric holding body to and from which a fabric is capable of being attached and detached, said moving body being freely supported on an upper surface of a bed for movement in a plane perpendicular to said direction in which the needle rod moves, drive means coupled to said moving body in such a manner that said moving body is moved under electrical control in said plane along perpendicularly intersecting X and Y axes individually or along a resultant direction, memory means for successively storing needle descent position data for each stitching pattern as movement data in the X and Y directions from a stitching starting position to a stitching end position and for storing a fixed position in the X and Y directions as a first origin, means for reading said movement data out of said memory means, and first control means for driving said drive means in relation to the read movement data, the improvement comprising:

starting means for generating a start signal by a manual operation to start a driving source of the sewing machine;

manual operating means for generating a position signal in the X and Y directions before generation of said start signal;

second control means for controlling said drive means to move said moving body in response to said position signal;

third control means for storing a position in the X and Y direction corresponding to said position signal as a second origin; and

fourth control means for controlling said drive means to move said moving body to a stitching starting position of said second origin in response to said start signal and to return said moving body to said second origin after completion of the stitching pattern.

4,694,763

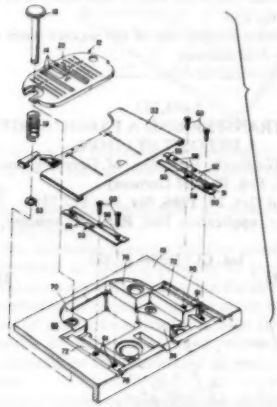
SEWING MACHINE BED SLIDE RETENTION

Kenneth D. Adams, Madison, N.J., assignor to SSMC Inc., Stamford, Conn.

Continuation of Ser. No. 179,861, Aug. 20, 1980, abandoned. This application Sep. 29, 1982, Ser. No. 427,208

Int. Cl.⁴ D05B *73/12*

U.S. Cl. 112—184 **2 Claims**



1. A sewing machine comprising a frame including a head and a work supporting bed, said head supporting therein an endwise reciprocating sewing needle, said work supporting bed being fashioned of molded synthetic resin material and having a cavity therein for a sewing machine loop taker for cooperation with said sewing needle in the formation of stitches, a throat plate spanning said cavity, said throat plate having an orifice for passage of said sewing needle to said loop taker, a bed slide adjacent said throat plate, said, bed slide spanning said cavity and extending beyond said throat plate on both sides of said throat plate, and means adjacent said cavity on opposite sides thereof for slidably holding said bed slide to said bed for selective movement from a position abutting said throat plate to a position spaced from said throat plate to expose said sewing machine loop taker, said means including at least a pair of apertures in said work supporting bed, one each of said apertures on opposite sides of and spaced from said cavity a distance amenable to good molding practice for the synthetic resin material, said bed slide further comprising ends beyond both sides of said throat plate doubled back under said slide and spaced therefrom so that the ends thereof lie beyond both sides of said throat plate aligned with and directed towards each other, said holding means comprising a pair of first steps in said work supporting bed one each beyond both sides of said throat plate for slidably receiving said bed slide for selective positioning abutting said throat plate and spaced thereform, a pair of second steps on both sides of said cavity one adjacent each of said first steps and spaced from said bed slide a pair of sheet metal Z shaped members, each having a lower bar, an upper bar, and a leg joining said lower and said upper bars, said lower bars thereof supported one on each of said second steps and said upper bars thereof adapted to extend one on each end of said bed slide between said bed slide and said doubled back ends, and means for retaining said lower bars on said second steps.

4,694,764

LATERALLY SWINGABLE SEWING MACHINE PRESSER DEVICE

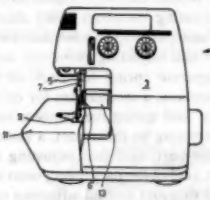
Heinz Janouschek, Steckborn, Switzerland, assignor to F. Gegauf AG Bernina Nähmaschinenfabrik, Steckborn, Switzerland

Filed Jan. 21, 1986, Ser. No. 820,681

Claims priority, application Switzerland, Jan. 31, 1985, 420/85

Int. Cl.⁴ D05B *29/00*

U.S. Cl. 112—237 **14 Claims**



1. A fabric presser device for sewing machines possessing a needle bar carrying a needle, comprising:

a spring-loaded presser-bar possessing a predetermined end;

said presser-bar possessing a longitudinal axis;

said presser-bar being arranged substantially parallel to said needle bar;

a presser-bar guide;

a connecting element;

said presser-bar guide being attached to said presser-bar by means of said connecting element;

guide means extending substantially parallel to said longitudinal axis of said presser-bar and guiding said presser-bar guide;

said guide means containing a guide groove defining one side and an open upper end on said one side of said guide groove;

lifting means engaging said presser-bar guide for lifting said presser-bar;

a presser-foot mounted at said predetermined end of said presser-bar;

said presser-bar, when lifted into a raised position under the action of said lifting means upon said presser-bar guide, rendering pivotable said presser-foot about said longitudinal axis of said presser-bar such that said presser-foot is rendered laterally pivotable below said needle bar and away from a stitching region defined by said needle;

a housing of said sewing machine;

said presser-bar being mounted in said housing; and

said presser-foot being pivotable conjointly with said presser-bar.

4,694,765

ADJUSTABLE APPARATUS FOR SEWING MACHINE THREAD TENSIONING DEVICE

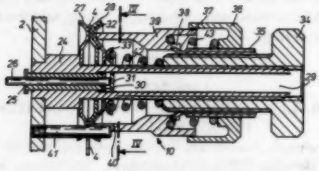
Konrad Diehl, Bexbach, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 892,481

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529369

Int. Cl.[4] D05B *47/02*

U.S. Cl. 112—254 **10 Claims**



1. A sewing machine tensioning device for a needle thread, comprising a mounting pin having a threaded section, first and second cooperative gripping discs mounted on said pin for tensioning a needle thread, first and second adjusting members, a release disc for each adjusting member, said first and second adjusting members being mounted on said pin on the same axis and being capable of movement with respect to one another, at least one of said adjusting members being mounted on said threaded section of said pin, a spring mechanism for adjusting the tension between said adjusting members and said release discs including a separate spring for each of said first and second adjusting members, a mechanism for occasionally suspending the effect of said spring mechanism, said second adjusting member comprising an inner part, a stationary support fitting onto said inner part, said first adjusting member comprising an outer part, said outer part fitting onto said stationary support, each of said first and second adjusting members being associated with a respective spring, said mechanism for occasionally suspending the effect of said spring mechanism including two release members mounted for movement with respect to each other and engageable with said release discs for the purpose of occasional suspension of the effect of each of said springs for a graduated release of the tensioning of the thread.

4,694,766

METHOD AND APPARATUS FOR REGISTERING AND CLAMPING LARGE WORKPIECES

Francis A. Wickers, Beverly, and Max Raines, Salem, both of Mass., assignors to USM Corp., Flemington, N.J.

Filed Dec. 29, 1986, Ser. No. 947,015

Int. Cl.[4] D05B *21/00*

U.S. Cl. 112—262.1 **12 Claims**

1. Apparatus for registering and clamping large pieces of work within a pallet that is to be attached to the movable carriage of an automatic sewing machine, said apparatus comprising:

means for registering and clamping a first flat piece of work within the pallet;

means for registering only the central portion of a second piece of work relative to the first flat piece of work;

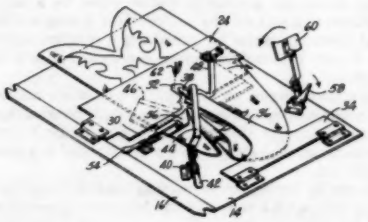
means for registering one side of the second piece of work relative to the first piece of work after folding the one side of the second piece of work;

means for clamping the one folded side of the second piece of work adjacent to the fold;

means for registering the other side of the second piece of work relative to the first piece of work by folding the other side of the second piece of work; and

means for clamping the other folded side of the second piece of work adjacent to the fold therein.

7. A method for registering and clamping large pieces of work within a flat pallet that is to be attached to the movable



carriage of an automatic sewing machine, said method comprising the steps of:

registering and clamping a first flat piece of work within the pallet;

registering only the central portion of a second piece of work relative to the registered and clamped first flat piece of work;

folding one side of the second piece of work so as to thereby register the folded side relative to the first piece of work;

clamping the one folded side of the second piece of work adjacent the fold;

folding the other side of the second piece of work so as to thereby register the other folded side relative to the first piece of work; and

clamping the other folded side of the second piece of work adjacent the fold therein.

4,694,767

DEVICE FOR TRANSFERRING A FABRIC STRIP FROM A DEPOSIT STATION

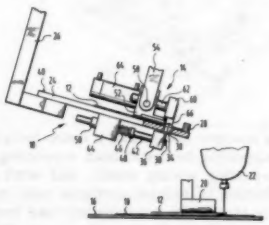
Alfons Beisler, Goldbach, Fed. Rep. of Germany, assignor to Beisler GmbH, Fed. Rep. of Germany

Filed Oct. 24, 1986, Ser. No. 922,744

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1985, 3539551

Int. Cl.[4] D05B *27/00*

U.S. Cl. 112—303 **11 Claims**



1. In a device for transferring a fabric strip from a deposit

station to a support base including a transfer clamp for carrying the fabric strip from the deposit station to the support base, the improvement comprising:

a plate **24** having a major surface **40** onto which the fabric strip **12** is placed, an end of the plate **24** having a ledge **28** abutting one end of the fabric strip **12**, the plate **24** having an opening **30** therein spaced from the ledge **28**;

a folding bar **34** extending upwardly through the opening **30** to raise a portion of the fabric strip **12** above the surface **40**;

said transfer clamp **14** having a pair of opposing members **52** and **60** positioned on opposite sides of said folding bar when the transfer clamp is in a receiving position adjacent plate **24**; and

means for pivoting the transfer clamp about an axis **58** parallel to said members.

8. Apparatus for folding and transferring a fabric strip in a folded condition from a deposit station to another piece of fabric lying on a sewing machine table, said apparatus comprising:

a plate **24** having a major surface **40** on which the fabric strip initially rests, the plate **24** having a ledge **28** on an end thereof against which an edge of fabric strip **12** abuts, the plate **24** having an opening **30** therein spaced a given distance from the ledge **28**;

a folding bar **34** projecting through the opening **30** for raising the fabric strip **24** from the surface **40**; and

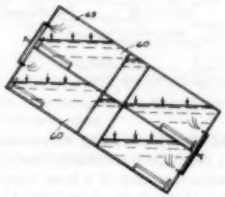
transfer clamp means **14** for grasping the raised fabric strip **12** and carrying the fabric to the sewing machine table in a folded condition.

4,694,768

EMERGENCY AIR SYSTEM FOR PARTIALLY SUBMERGED VESSELS

Leonard Aloisio, P.O. Box 276, Patterson, La. 70392

Filed Dec. 23, 1985, Ser. No. 812,731
Int. Cl.[4] B63J *2/04*
U.S. Cl. 114—71 **9 Claims**



1. A system for providing pressurized air to quarters within a ship in the event the ship capsizes or sinks, the system comprising:

a. a first quantity of breathable air contained under pressure on board ship;

b. a line extending between the first quantity of pressurized breathable air from a plurality of pressure tanks to the various rooms contained within the ship for supplying the breathable air thereinto upon a given impulse, a first portion of the tanks providing a high flow of air into the various rooms, and the second portion of tanks providing a metering of the pressurized air over a longer length of time;

c. sensing means, provided in the system, for sensing the position of the ship in the water, and upon the ship reaching a certain degree of listing, signaling the release of pressurized breathable air in the system;

d. valving means contained in the line for regulating the quantity of air being transported between the pressurized breathable air and the individuals rooms; and

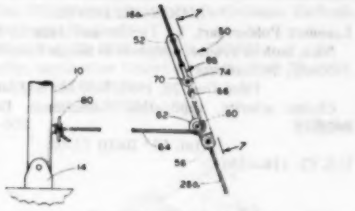
e. means for allowing the high flow of air to be first transported to the various rooms and following the use of this quantity of air, subsequently allowing the metered breathable air to begin flowing to be transported into the various rooms.

4,694,769

METHOD AND APPARATUS FOR STEPPING A SAILBOAT MAST

J. James Sowers, 3 Makanna Dr., Huntington, N.Y. 11743

Filed Jan. 9, 1987, Ser. No. 1,911
Int. Cl.[4] B63B *15/02*
U.S. Cl. 114—90 **3 Claims**



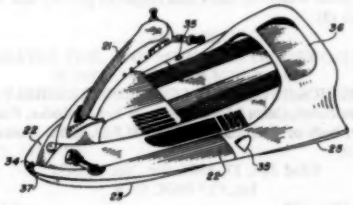
1. Apparatus for connecting a mast stay of a sailboat to the hull to enable the holding erect and tensioning of the mast by a single individual comprising a clevis coupling attached at one end to said hull and having a pair of parallel legs, each provided with a plurality of mutually paired holes, a retaining pin adapted to enter into a selected one of said pairs of holes, a pulley located at the bight of said coupling adjacent the connecting web of the legs, and a pull cable entrained over said pulley adapted to be releasably attached at one end to said stay whereby said line may be pulled over said pulley to cause said stay to hold said mast erect whereby said retaining pin may be located through the end of said stay and a selected pair of said holes.

4,694,770

WATERCRAFT STABILIZING FLOTATION STRUCTURE

William M. Kitner, 3515 W. 118 Pl., Inglewood, Calif. 90303, and James B. Hart, 227 E. 52nd St., Long Beach, Calif. 90805

PCT No. PCT/US84/01221, § 371 Date May 10, 1985, § 102(e) Date May 10, 1985, PCT Pub. No. WO85/01486, PCT Pub. Date Apr. 11, 1985
PCT Filed Jul. 30, 1984, Ser. No. 740,850
Int. Cl.[4] B63B *35/84*
U.S. Cl. 114—123 **20 Claims**



1. A watercraft stabilizing floatation structure attached to a self-propelled watercraft comprising:

(a) a forward hull having a front, rear, sides and a floatation chamber therein, said rear having a female recess,

(b) an aft hull having a front, rear, sides with a floatation chamber therein, said front having a raised male boss in alignment with said female recess and said rear having an integral seat connecting the sides in bridge fashion,

(c) side attaching means disposed upon each side of said forward and aft hull in such a manner as to compressibly couple them together when mating male boss and corresponding female recesses are aligned, and,

(d) a recessed channel integral with said hulls on a horizontal plane contiguous to and of a shape conforming to a outwardly extending separation rail on said watercraft for retention of said hulls on said sides, said hulls adapted to be retained to said watercraft along each side and front for increasing stability to said watercraft when stationary within the water by extending the lateral floatation surface.

4,694,771

MOORING DEVICE

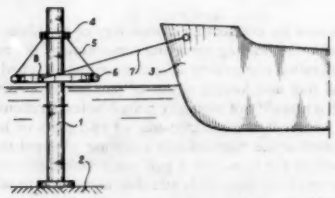
Leendert Poldervaart, La Turbie, and Jean C. M. Personnat, Nice, both of France, assignors to Single Buoy Moorings Inc., Marly, Switzerland

Filed Dec. 20, 1985, Ser. No. 811,400

Claims priority, application Netherlands, Dec. 31, 1984, 8403978

Int. Cl.⁴ B63B *21/00*

U.S. Cl. 114—230 **9 Claims**



1. In a mooring device comprising a body (**1**) having a portion located at a distance above the bottom (**2**) of the body of water, which body is attached to said bottom (**2**) and has a support (**4**) which can rotate about a vertical axis and by means of downwardly extending elements (**5**) carries swingably about a horizontal axis a weight-loaded construction (**6**), which under the influence of its own weight has its center of gravity below its virtual point of suspension from the support (**4**), and a connecting member (**7**) between a vessel (**3**) and a point (**8**) of connection on said construction (**6**); the improvement in which said point (**8**) of connection on the construction (**6**) and the vessel (**3**) are located on opposite sides of a first imaginary vertical plane which includes the center of gravity of said construction (**6**) and is perpendicular to a second imaginary vertical plane which includes said center of gravity and bisects the vessel (**3**).

4,694,772

DIVER'S BUOYANCY COMPENSATOR BELT

Mark Faulconer, Costa Mesa, and Scott E. Greatrake, Fountain Valley, both of Calif., assignors to U.S.D. Corp, Santa Ana, Calif.

Filed Jun. 17, 1985, Ser. No. 745,492

Int. Cl.⁴ B63C *9/24*

U.S. Cl. 114—315 **6 Claims**

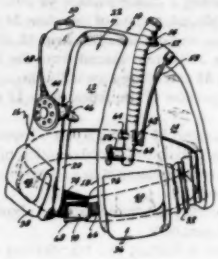
5. A buoyancy compensator belt for use with a buoyancy compensator comprising:

a belt for circumscribing a user's waist formed of an elastomeric material substantially similar to wetsuit material for a diver;

said belt having at the ends thereof a looped pile material on one end thereof and a multiplicity of hooks at the other end for being received on said looped pile material for detachably connecting the ends of said belt to each other in order to circumscribe a user's waist;

strap means connected to said belt;

a plurality of looped keepers connected to said buoyancy compensator for receiving said strap on said buoyancy compensator for connecting said belt to said buoyancy compensator;



means for connecting the ends of said strap means that interconnect said belt to said buoyancy compensator in the form of a buckle and handle means.

4,694,773

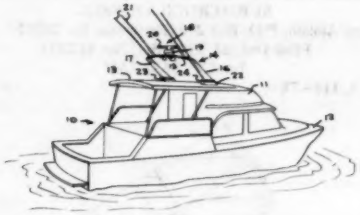
REMOTE CONTROL TILTING SYSTEM FOR RAISING AND LOWERING RADAR AND RADIO ARCH FOR BOATS

Laurie R. Sparkes, and Joseph G. Baker, both of Richmond, Va., assignors to JGB Industries, Inc., Richmond, Va.

Filed Mar. 7, 1986, Ser. No. 837,281

Int. Cl.⁴ H01Q *1/32*

U.S. Cl. 114—354 **15 Claims**



1. A tiltable upwardly extending supporting arch assembly for supporting a radar antenna above the roof of a cabin or control bridge superstructure of a boat comprising a unitary rigid arch member of inverted substantially U-shaped configuration including a generally horizontal top portion transversely spanning a major portion of the width of the roof and a pair of depending leg portions extending downwardly from opposite ends of the top portion having feet at their lower ends for attachment to mounting assemblies, a pair of tilting base mounting assemblies at the lower ends of said leg portions each having a box-like base housing component in the shape of an elongated box shaped housing to be fixed to the roof and having side members and a tiltalbe top plate member for attachment to the arch member feet pivotally coupled to said side walls of said box-shaped housing by a pivot pin for angular movement about the pivot pin from a first position disposing the arch member in a raised normal operating position to a second position disposing the arch member in a lowered position wherein the leg portions lie substantially parallel to confronting surface portions of the roof, powered actuator means contained in said box-shaped housing having a movable drive member coupled to said top plate member eccentrically of said pivot pin for drawing the top plate member and arch member attached thereto between said first and second position, and remote control means including a three-position toggle switch coupled to said actuator means to condition the actuator means at first and second position of said switch for movement of the

top plae member of each mounting assembly to said first and second positions and to deactivate the actuator means at a third position of said switch.

4,694,774

SHAPE ADAPTABLE PROTECTIVE CUSHION DEVICE AND METHOD OF MAKING AND USING SAME

Howard W. Keithley, Jr., Adelphi, Md., assignor to Marie E. Keithley; Steven W. Keithley and Gwenn M. Kelly, all of Adelphi, Md., part interest to each

Filed Mar. 29, 1985, Ser. No. 717,793

Int. Cl.⁴ B63B *17/00*

U.S. Cl. 114—361 **14 Claims**

1. A protective device for covers for boats comprising:
a base member;
said base member being made of material which is bendable and has a shaped form retention characteristic;
retaining means which can be shaped about a boat element to fasten the device thereto including laterally projecting arms connected to and made of the same material as said base member for retaining the shaped form after being bent about said boat element;
cushioning means permanently affixed to said base member; and
resilient friction retention means affixed to at least the tips of said projecting arms.

4,694,775

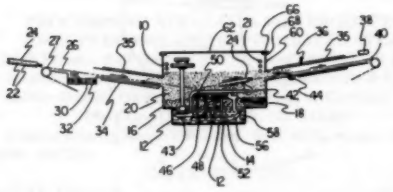
VAPOR PHASE PROCESSING MACHINE

Gerard G. Derrico, Maynard, Mass., assignor to Dynapert-HTC Corporation, Concord, Mass.

Filed Jun. 23, 1986, Ser. No. 877,577

Int. Cl.⁴ B05C *15/00, 5/02*

U.S. Cl. 118—64 **3 Claims**



1. A vapor phase processing machine comprising
a tank open at its top for containing an electronic liquid,
means for vaporizing the electronic liquid to form a saturated vapor zone,
inlet and outlet throats communicating with the sides of said tank,
means for conveying product through said inlet throat into said tank and for conveying processed product from said tank through said outlet throat,
means for closing the top opening of said tank, including a lid assembly having universal joint means,
an arm hingedly secured to one side of said tank,
means for connecting said arm and said universal joint means so that said lid assembly can move universally relative to said arm, and
means for constraining said universal movement of said lid assembly relative to said arm to within selected limits.

4,694,776

STEP AND REPEAT APPARATUS

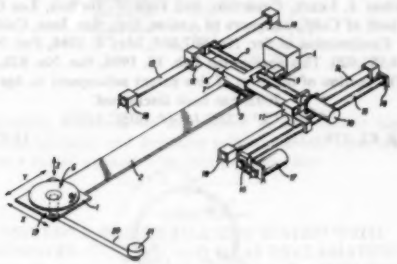
Rex H. Sandbach, Stockport, and Alan Poole, Macclesfield, both of United Kingdom, assignors to Co-Ordinate Technology Ltd., Lancaster, England

Filed Jun. 21, 1985, Ser. No. 747,662

Claims priority, application United Kingdom, Jun. 21, 1984, 8415912; May 20, 1985, 8512679

Int. Cl.⁴ B05C *13/02*

U.S. Cl. 118—500 **2 Claims**



1. Step and repeat apparatus comprising a support for a workpiece and an arm, said support being attached by means of said arm to a movement control mechanism adapted to move said support in two dimensions, said arm having a pivot end and a movement end opposite said pivot end, said pivot end of said arm being secured to allow said arm to rotate about a horizontal pivotal axis at said pivot end, with said movement end of said arm secured to said movement control mechanism at a location remote from said support, said apparatus further comprising lifting means arranged to move the support about the pivot in a plane perpendicular to said two dimensions, said lifting means positioned substantially at said movement end of said arm.

4,694,777

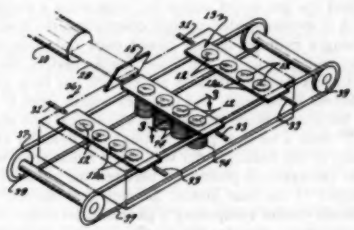
APPARATUS FOR, AND METHODS OF, DEPOSITING A SUBSTANCE ON A SUBSTRATE

Gregory A. Roche, 4287 Drybed Ct., Santa Clara, Calif. 95054

Filed Jul. 3, 1985, Ser. No. 751,682

Int. Cl.⁴ B05D *3/06;* C23C *14/00*

U.S. Cl. 118—725 **38 Claims**



1. In combination for providing for the direction of a sub-

stance to a surface of a substrate to affect the surface of the substrate,

means for holding the substrate in a planar disposition,

means for directing a beam of substantially coherent light in a first direction substantially parallel to, and contiguous with, the substrate,

means for introducing to the substrate gases having properties of combining chemically to produce the substance when energized by the beam to provide for a direction of the substance to the substrate, and

means for reflecting the beam of substantially coherent light after movement of the beam past the substrate to obtain a movement of the beam of substantially coherent light in a second direction substantially parallel to, and contiguous with, the substrate.

4,694,778

CHEMICAL VAPOR DEPOSITION WAFER BOAT

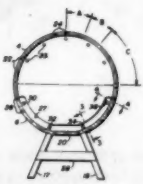
Arthur J. Learn, Cupertino, and Dale R. DuBois, Los Gatos, both of Calif., assignors to Anicon, Inc., San Jose, Calif.

Continuation of Ser. No. 607,065, May 4, 1984, Pat. No. 4,582,020. This application Feb. 10, 1986, Ser. No. 828,625

The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.

Int. Cl.[4] C23C *16/44;* **B05C** *13/02*

U.S. Cl. 118—728 **11 Claims**



1. A chemical vapor deposition wafer boat means for supporting a plurality of wafers in an evenly spaced, upright orientation perpendicular to the axis of the boat, the boat comprising a cylinder having closed ends and comprised of mutually engaging upper and lower hemicylinders, the upper hemicylinder having diffusion zones with gas flow passageways therein in the ends and in zones within from 0° to 75° from a horizontal plane through the cylinder axis and from 0° to 15° from a vertical plane through the cylinder axis, the remainder of the hemicylinder wall being baffle areas without gas flow passageways, the ends and sidewall of the lower hemicylinder comprising gas diffusion zones, the gas flow passageways comprising from 0.5 to 80 percent of the surface area of the respective gas diffusion zones.

6. A chemical vapor deposition apparatus comprising a vapor deposition chamber having a gas inlet means positioned in the upper portion of the chamber for introducing gases into the chamber and a gas outlet means positioned in the lower portion of the chamber for removing gases from the chamber, a cylindrical wafer boat means positioned between the gas inlet means and the gas outlet means for supporting a plurality of wafers in an evenly spaced, upright orientation, the boat means comprising a cylinder having closed ends and comprised of mutually engaging upper and lower hemicylinders, the upper hemicylinders having diffusion zones with gas flow passageways therein in the ends and in zones within from 0° to 75° from a horizontal plane through the cylindrical axis and from 0° to 15° from a vertical plane through the cylinder axis, the remainder of the hemicylinder wall being baffle areas without gas flow passageways positioned between the gas inlet means and interior of the boat means, the ends and sidewall of the lower hemicylinder comprising a gas diffusion zones with gas flow passageways therein, the gas flow passageways comprising from 0.5 to 80 percent of the surface area of the respective gas diffusion zones.

4,694,779

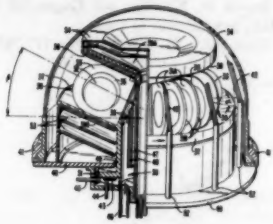
REACTOR APPARATUS FOR SEMICONDUCTOR WAFER PROCESSING

Martin L. Hammond, Cupertino, and Charles L. Ramiller, Santa Clara, both of Calif., assignors to Tetron, Inc., Fremont, Calif.

Filed Oct. 19, 1984, Ser. No. 662,879

Int. Cl.[4] C23C *13/08*

U.S. Cl. 118—730 **24 Claims**



1. A chemical vapor deposition reactor comprising

a carrier having a plurality of cells arranged in a circle around a center, each cell having a pair of opposing flat surfaces with means for mounting substrates thereto, said surfaces oriented in two non-parallel planes intersecting in a line so as to form a first angle α with each other at said intersecting line, said intersecting line forming a second angle β with respect to the vertical;

a pair of gas flow directors, a first director located below said carrier and a second director located above said carrier to maintain any gas flow through said carrier;

an inlet means for introducing gas around the periphery of said carrier; and

an exhaust means for removing gas from said center of said plurality of carrier cells;

whereby gas flows through each cell in a direction substantially perpendicular to said intersecting line.

4,694,780

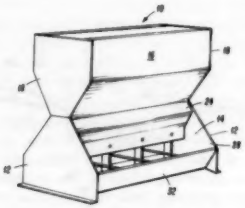
ANIMAL ACTUATED FEEDER

Dale H. Keuter, 1026 Sherman Ave., and Karl A. Keuter, R. R. #1, P.O. Box 257B, both of Manchester, Iowa 52057

Filed Feb. 14, 1986, Ser. No. 829,207

Int. Cl.[4] A01K *1/10*

U.S. Cl. 119—53.5 **6 Claims**



2. An animal-actuated feeder comprising means defining a feeder area accessible to the animal; feed storage means having a feed discharge opening disposed over the feeding area; feed dispensing means located between the feeding area and the feed storage means to receive feed from the storage means and dispense the feed into the feeding area; the feed dispensing means including a cradle positioned beneath the discharge opening of the feed storage means to normally prevent the gravity-flow of feed from the storage means into the feeding area, the cradle being pivotally mounted on a horizontal axis for limited pivotal movement; the feed dispensing means also

including a wiper positioned inside of the cradle in a fixed position so as to move the feed out of the cradle as the cradle pivots; a member extending within the feeding area so as to be moveable by an animal to produce pivotal movement of the cradle whenever the member is moved by an animal; and actuating means operatively connecting the cradle with the animal-actuated member.

4,694,781

CONTAINER FOR ATTACHMENT TO ANIMAL EAR TAGS

Steve R. Howe, 27 University Dr., Longmont, Colo. 80501; William B. Warner, 2338 W. Rockwell Ct., Chandler, Ariz. 85224, and J. Wallace Shores, 10202 N. 51st Dr., Glendale, Ariz. 85302

Filed Nov. 29, 1985, Ser. No. 802,961
Int. Cl.[4] G09F *3/00*; A01K *13/00*
U.S. Cl. 119—156 **12 Claims**

1. For use with an animal ear identification tag having at least two parts comprising a backing portion with an elongated spike for passing through the ear of the animal and a tag portion with a hollow hoss for receiving and holding said spike after passage of the same through the ear of the animal, a container including in combination:

attachment means made of frangible material for press fit frictional engagement with the boss of said tag portion to permit relatively easy placement over said boss whereby said attachment means is secured to said boss and said attachment means being structured to break upon removal from said boss; and

hollow housing means coupled to said attachment means.

4,694,782

PROCESS AND APPARATUS FOR PRODUCING HIGH-PRESSURE AND SUPERHEATED STEAM

Ulrich Premel; Rolf Dorling, and Manfred Schultze, all of Gummersbach, Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Gummersbach, Fed. Rep. of Germany

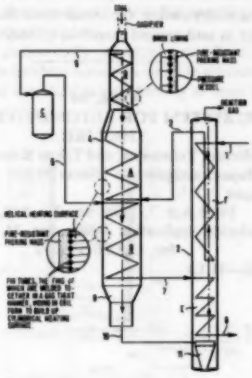
Filed Dec. 20, 1985, Ser. No. 811,497
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447265
Int. Cl.[4] F22D *1/00*
U.S. Cl. 122—7 R **42 Claims**

1. A process for producing high-pressure and superheated steam by means of hot reaction gas from a gas generator in which coal or carbon-containing materials are gasified; said process includes the steps of:

producing said high-pressure, superheated steam in said gas generator and in a waste heat system;

said producing step comprises producing said steam in at least two successive stages, including, in a first stage, producing said steam in a radiation vaporizer, and in a subsequent second stage, conveying said steam through a radiation superheater;

providing a further superheating stage, in the form of an end stage, at the outlet side of said radiation superheater in said gas generator; and



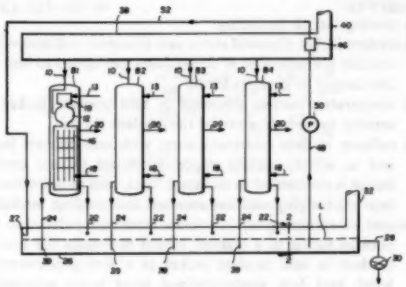
providing a convection superheater as said further superheating stage, and disposing said convection superheater in a vessel separate from said gas generator.

4,694,783

MULTIPLE BOILER HEATING SYSTEM WITH IMPROVED VENTING AND HEAT RECLAMATION

Clarence W. Cleer, Jr., 98 Fraley St., Kane, Pa. 16735-9524

Filed Jan. 9, 1987, Ser. No. 1,747
Int. Cl.[4] F22B *37/42*; F22D *5/00*
U.S. Cl. 122—448 B **12 Claims**



1. A heating system comprising:

a plurality of boilers of the condensing type each having a combustion chamber, an air inlet for providing air into said combustion chamber, a heat exchanger having a fluid inlet and a fluid outlet and disposed in heat exchange relation with hot combustion gases flowing from said combustion chamber, and an exhaust gas outlet;

means for reclaiming heat from the exhaust gases comprising a first manifold common to said boilers, means for directing the hot exhaust gases and condensate from each boiler into said first manifold wherein the exhaust gases and condensate are placed in heat exchange relation, a second manifold for receiving air external to said heating system, said air inlet for each said boiler lying in communication with said second manifold for flowing air into the corresponding combustion chamber, a heat exchanger in said second manifold, means for flowing heated condensate from said first manifold to said heat exchanger in said second manifold for placing the condensate in heat ex-

change relation with the inlet air, thereby preheating the air flowing into the combustion chambers of the boilers; and

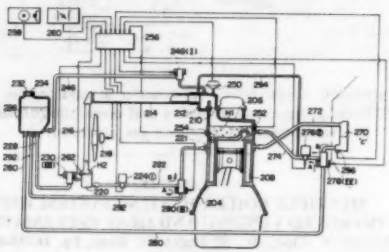
means for recirculating the condensate from said heat exchanger in said second manifold to said first manifold.

4,694,784

COOLING SYSTEM FOR AUTOMOTIVE ENGINE OR THE LIKE

Yoshinori Hirano, Yokohama, and Takao Kubozuka, Yokosuka, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 7, 1986, Ser. No. 849,115
Claims priority, application Japan, Apr. 24, 1985, 60-88266
Int. Cl.[4] F01P *3/22*
U.S. Cl. 123—41.12 **22 Claims**



1. In an internal combustion engine having a structure subject to high heat flux;

a cooling system for removing heat from said engine comprising:

a cooling circuit including:

a coolant jacket disposed about said structure and into which coolant is introduced in liquid form, permitted to boil and discharged in gaseous form;

a temperature sensor disposed in said coolant jacket for sensing the temperature of the coolant therein;

a radiator in fluid communication with said coolant jacket and in which coolant vapor produced in said coolant jacket is condensed to its liquid form, said radiator having heat exchanging surfaces exposed to a cooling medium;

means for returning liquid coolant from said radiator to said coolant jacket in a manner which maintains the level of coolant in said coolant jacket at a first predetermined level, said first predetermined level being selected to immerse said structure in a predetermined depth of liquid coolant;

a first level sensor disposed in said radiator for sensing the level of liquid coolant being above a second predetermined level;

a device for varying the amount of cooling medium which flows over the heat exchanging surfaces of said radiator;

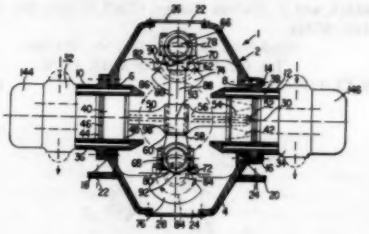
a control circuit responsive to said temperature sensor and said first level sensor, said control circuit being arranged to energize said device (a) at a first level in response to said temperature sensor indicating that the temperature of the coolant in said coolant jacket is above a desired target value and said level sensor indicating that the level of coolant in said radiator is above said second predetermined level and (b) at a second level in response to said temperature sensor indicating that the temperature of the coolant in said coolant jacket is above a desired target value and the said level sensor indicating that the level of coolant in said radiator is below said second predetermined level.

4,694,785

PISTON APPARATUS

Tom Timmerman, 207-145 West 18th Street, North Vancouver, British Columbia, Canada V7L 2V6, and Norman V. Chapman, 20481-92A Avenue, Langley, Canada V1M 1B7

Filed Jan. 23, 1986, Ser. No. 821,823
Int. Cl.[4] F02B *75/32*
U.S. Cl. 123—52 A **6 Claims**



1. A piston apparatus comprising:

(a) a first pair of spaced-apart cylinders aligned along a cylinder axis;

(b) a pair of pistons, each piston being slidably received in one of the cylinders for reciprocation along the axis;

(c) a pair of spaced-apart crank members on opposite sides of the cylinder axis, the crank members having parallel axes of rotation;

(d) a first gear wheel, a second gear wheel and a third gear wheel, the first and second gear wheels being operatively connected to the crank members, the third gear wheel meshing with and being located between the first and second gear wheels, the third gear wheel being rotatable about an axis midway between the axes of rotation of the crank members and parallel thereto, the gear wheels being adapted to couple the crank members together for rotation at the same rotational speed and in the same direction;

(e) a crank connecting member having a longitudinal axis which is perpendicular to the cylinder axis and having opposite ends, each said end only being rotatably connected to one of the crank members a distance from the axis of rotation thereof, the crank connecting member being connected at a distance equal at each end from the axis of rotation of the crank member connected thereto, the longitudinal axis of the crank connecting member and the cylinder axis extending along a common plane, the axes of rotation of the crank members being perpendicular to the plane; and

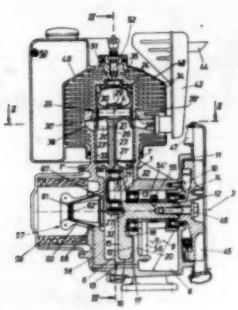
(f) a piston connecting member interconnecting the pair of pistons and having an aperture extending therethrough in a direction perpendicular to the cylinder axis, the crank connecting member being slidably received in the aperture to permit relative movement between the piston connecting member and the crank connecting member along the longitudinal axis of the crank connecting member, the piston connecting member and the crank connecting member being carried together for movement parallel to the cylinder axis.

4,694,786

ONE-CYLINDER, TWO-STROKE INTERNAL COMBUSTION ENGINE WITH CRANKCASE SCAVENGING

Andreas Bilek, and Peter Wünsche, both of Graz, Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik m.b.H., Prof.Dr.Dr.h.c. Hans List, Graz, Austria

Filed Jun. 27, 1986, Ser. No. 879,309
Claims priority, application Austria, Jul. 25, 1985, 2215/85
Int. Cl.[4] F02B *33/04*
U.S. Cl. 123—73 AD **10 Claims**



1. A crankcase-scavenging internal combustion engine which comprises

a crankcase which defines an opening for a mixture of air and lubricant,

a crankshaft rotatably mounted in said crankcase,

a lubricant reservoir containing lubricant,

a part positioned over said opening of said crankcase for providing a mixture of air and lubricant thereto when a vacuum is created in said crankcase, said part including a bottom end having a cross-rib, a side wall and a top end and defining a chamber therein which has a first diameter adjacent said bottom end and an increasing diameter between said bottom end and said top end, said part also defining a nozzle located in said cross-rib and communicating with said chamber, at least one lubricant feed line extending in said side wall and in said cross-rib to communicate with said nozzle, and air intake openings at said bottom end, and

a lubricant supply line extending from said lubricant reservoir to said part to supply lubricant to each lubricant feed line in said part.

4,694,787

AUTOMATIC FLUID DISTRIBUTING VALVE TIMING DEVICE

Gary E. Rhoads, 8565 Boulder Dr., La Mesa, Calif. 92041

Filed Feb. 27, 1984, Ser. No. 583,998
Int. Cl.[4] F01L *9/02*
U.S. Cl. 123—90.13 **11 Claims**

1. In an internal combustion engine having a plurality of combustion chambers each of which has an intake valve and an exhaust valve, the invention comprising:

a fluid reservoir;

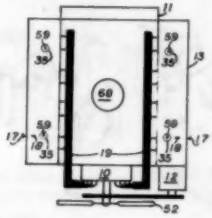
a high pressure fluid pump connected to said fluid reservoir;

a high pressure fluid distributor assembly connected to said high pressure fluid pump, said distributor assembly having a rotor fixedly mounted on a shaft so that they rotate as one, said rotor being in the form of a disc having a front face and a rear face, said rotor having a radially extending fluid passage within its interior, said fluid passage having an inner end and an outer end, means connecting said inner end to said high pressure fluid pump;

said rotor having at least a first outlet port on its front face that is in communication with the fluid passage within said rotor;

each of the valves of the engine having an actuation unit connected to the top of said valve for opening said valve at a predetermined time;

manifold means periodically connecting said fluid passage to each of said individual actuation units in a predetermined sequence, said manifold means having at least a primary



annular shaped disc that is positioned flush against the front face of said rotor, said primary disc having a predetermined number of aperatures spaced circumferentially about a radius on said primary disc equal to that of the radius of said first outlet port, said individual apertures each being connected to its own separate valve actuation unit; and

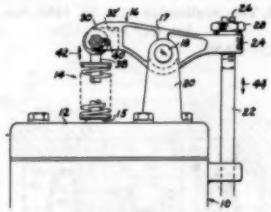
means for rotating said rotor.

4,694,788

INTERNAL COMBUSTION ENGINE ROCKER ARM

John A. Craig, P.O. Box 5772, Enid, Okla. 73702

Filed Mar. 28, 1986, Ser. No. 845,308
Int. Cl.[4] F01L *1/18*
U.S. Cl. 123—90.16 **3 Claims**



1. In an internal combustion engine cylinder head exhaust valve operating elongated rocker arm having a friction reducing valve stem end contacting roller journalled by a bolt extending through a transverse bore in one end portion of the rocker arm normal to the axis of the valve stem, the improvement comprising:

means for adjusting the position of the roller longitudinally of the rocker arm and relative to the axis of the exhaust valve stem.

4,694,789

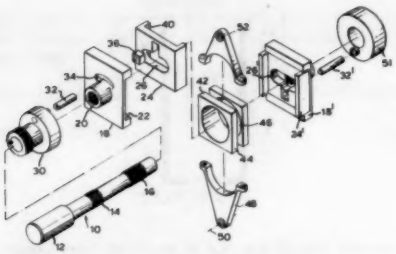
VARIABLE VALVE TIMING

Derek Frost, Leigh-On-Sea, United Kingdom, assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 8, 1985, Ser. No. 796,661
Claims priority, application United Kingdom, Nov. 9, 1984, 8428430
Int. Cl.[4] F01L *1/34*; F16F *15/26*
U.S. Cl. 123—90.17 **6 Claims**

1. A drive mechanism for connecting an input shaft to an

output shaft for rotation at the same speed while superimposing on the output shaft a variable oscillatory motion determined by the position of a reaction member, the drive mechanism comprising means fast in rotation with one of the input and output shafts defining a slideway transverse to the axis of said one of the shafts, a sliding member slidable along said driveway, means for sliding the sliding member along the slideway in synchronism with the rotation of the input shaft,



the amplitude of the sliding movement varing as a function of the position of the reaction member, the oscillation of the sliding member being symmetrical about a central position, and a crank pin fixed to the other of said input and output shafts and connected slidably to the said sliding member whereby as the sliding member slides along the slideway, the phase of the output shaft is varied with respect to the phase of the input shaft.

4,694,790

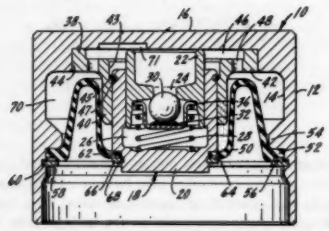
INVERTED BUCKET TAPPET WITH COLLAPSING DIAPHRAGM SEAL

Steven J. Kowal, Prospect Heights, Ill., assignor to Stanadyne, Inc., Windsor, Conn.

Continuation-in-part of Ser. No. 730,195, May 3, 1985, Pat. No. 4,624,225. This application Aug. 25, 1986, Ser. No. 900,169

Int. Cl.[4] F01L *1/24*

U.S. Cl. 123—90.58 **6 Claims**



1. A self-contained lash adjuster including a generally cylindrical cup-shaped follower having a closed end, a lash adjuster cartridge assembly, a spacer mounting said cartridge assembly within said follower,

said cartridge assembly including a reciprocally movable body and a plunger within said body, a high pressure chamber defined between said plunger and body, a plunger passage opening into said high pressure chamber, a check valve controlling flow through said plunger passage,

and a diaphragm-type seal attached at its outer periphery to an interior wall of said follower and attached at its inner periphery to the movable body, said seal cooperating with the interior wall of said follower and said body to define a fluid reservoir, said spacer being positioned within said reservoir and having openings therein to connect said reservoir with the plunger passage.

4,694,791

STARTING DEVICE WITH AIR MOTOR FOR INTERNAL COMBUSTION ENGINES

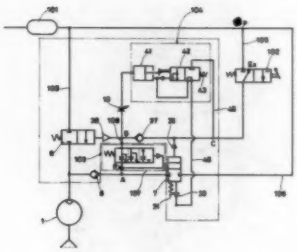
Masami Tanaka, Osaka, Japan, assignor to Showa Precision Machinery Co., Ltd., Amagasaki, Japan

Filed Mar. 25, 1986, Ser. No. 845,760

Claims priority, application Japan, Nov. 15, 1985, 60-257139

Int. Cl.[4] F02N *7/08*

U.S. Cl. 123—179 F **4 Claims**



1. In a pneumatically operated starter for internal combustion engines comprising a pneumatic motor, a driving shaft operatively connected to said pneumatic motor, said driving shaft having at one end a pinion or spline and being movable axially for selectively engaging and disengaging said pinion or spline with gear means of the engine to be started, air piston means for moving axially said driving shaft, main valve means positioned in a main passage of compressed air for controlling flow of compressed air from a supply thereof into said pneumatic motor, sub-valve means positioned in a sub-passage of compressed air communicating with said main passage for controlling flow of compressed air from said main passage into said air piston means, said main valve means and said sub-valve means being actuatable pneumatically by means of their respective air pistons and biassed normally into their closed positions, a first passage branched from said main passage for introducing compressed air to one side of said sub-valve air piston to open said sub-valve, said first passage including a start command valve therein, the improvement comprising, in combination:

a second passage of compressed air for establishing flow communication between said sub-passage and said air piston means in response to the opening of said sub-valve means to advance said driving shaft into the engagement with said engine gear by said pinion or spline, and at the same time for diverting part flow of compressed air to drive said pneumatic motor at low speed;

a third passage of compressed air for establishing flow communication between said air piston means and said main valve air piston in response to the advancement of said air piston means to actuate said main valve air piston to open the main valve for driving said pneumatic motor;

a fourth passage of compressed air for establishing flow communication between said first passage and the other side of said sub-valve air piston opposite to said one side to close said sub-valve means;

third valve means associated with said fourth passage for normally closing the fourth passage, said third valve means having associated therewith an air piston; and

a fifth passage of compressed air for establishing flow communication between said third passage and said third valve air piston to open said third valve means with some time delay relative to the opening of said main valve so that compressed air is introduced to said opposite side of said sub-valve air piston whereby said sub-valve means are

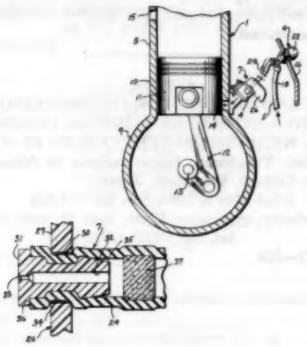
placed in closed position while said start command valve remains open.

4,694,792

WET PRIMING MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

Arvo F. Uuskallio, Hartland, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed May 3, 1985, Ser. No. 729,913
Int. Cl.[4] F02M *1/16*
U.S. Cl. 123—187.5 R **2 Claims**



1. A wet priming mechanism for an internal combustion engine, comprising an engine block defining a combustion chamber and having an opening therein communicating with said chamber, a fuel tank to contain a liquid fuel, a main fuel line connecting the fuel tank with the combustion chamber for supplying fuel to the chamber, a priming conduit providing a connection between said fuel tank and said chamber and having an inlet end communicating with said fuel tank and a discharge end communicating with said chamber, manual pumping means disposed in said priming conduit for pumping fuel in a direction toward said discharge end, said restrictor means comprising a housing having an opening, an adaptor containing said orifice, said priming conduit including a flexible resilient tube disposed around said adaptor, said adaptor having a central waist portion of reduced cross sectional area, said waist portion being in registry with said opening, the diameter of said opening being less than the combined external diameter of said tube and the portion of the adaptor located on either side of said waist portion, said tube being sufficiently resilient to enable said waist portion to be press fitted into registry with said opening.

4,694,793

ENGINE LUBRICANT TYPE AND CONDITION MONITORING SYSTEM

Tsunehiro Kawakita, Yokosuka, and Minoru Imajo, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 12, 1986, Ser. No. 929,373
Claims priority, application Japan, Nov. 15, 1985, 60-255109
Int. Cl.[4] F01M *1/00*
U.S. Cl. 123—196 S **9 Claims**

1. In an engine having a lubricating system, a lubricant monitoring system comprising:

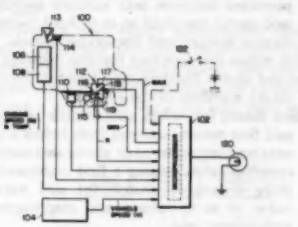
a first sensor for sensing the type of oil contained in the lubricating system;

a second sensor for sensing the level of oil in the lubricating system;

a third sensor for sensing a first system operation parameter which varies with the rate of degradation of the oil in the lubricating system;

control means responsive to said first, second and third sensors for:

(a) determining when an oil change is required;



(b) determining when the oil is drained from the system;

(c) determining the type of oil which is introduced following the draining; and

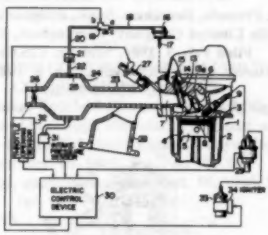
(d) setting values which are used to determine when an oil change is required.

4,694,794

METHOD AND DEVICE FOR CONTROL OF INTERNAL COMBUSTION ENGINE VARIABLE SWIRL AIR FUEL INTAKE SYSTEM WITH DIRECT HELICAL INTAKE PASSAGE

Kenji Kato; Soichi Matsushita, and Kiyoshi Nakanishi, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 681,681, Dec. 14, 1984, abandoned.
This application May 16, 1986, Ser. No. 865,655
Claims priority, application Japan, Aug. 20, 1984, 59-173008
Int. Cl.[4] F02M *25/06*
U.S. Cl. 123—306 **1 Claim**



1. For an air-fuel mixture intake system, incorporated in an internal combustion engine having a cylinder head which defines a combustion chamber, comprising an intake port, a downstream end of which opens to said combustion chamber and which includes a helical passage which extends helically around and toward said downstream end and straight passage which extends substantially straight toward said downstream end, and an intake passage switchover control valve which is convertible between a first position wherein the proportion of intake flow which passes through said straight passage relative to intake flow which passes through said helical passage is minimized, and a second position wherein said proportion is maximized,

a control device comprising:

a valve drive system including diaphragm means adapted to be actuated by intake vacuum present in an intake manifold of the engine so as to drive said intake passage switchover control valve to said first position when supplied with a certain determinate or greater level of

intake vacuum and to drive said intake passage switch-over control valve to said second position when supplied with atmospheric pressure, a vacuum switching valve for selectively either connecting said diaphragm means to said intake manifold or releasing said diaphragm means to the atmosphere, and a one way valve provided between said vacuum switching valve and said intake manifold so as to hold vacuum on one side thereof toward said diaphragm means;

first means for detecting throttle opening;

second means for detecting vacuum level present in the intake manifold of the engine;

third means for, when said throttle opening detected by said first means increases from below a certain determinate opening value to or above said certain determinate opening value, issuing a first command for said valve drive system to switchover said vacuum switching valve so as to release said diaphragm means to the atmosphere; and

fourth means for, when said vacuum level present in the intake manifold of the engine detected by said second means rises from below said certain determinate vacuum level to or above said certain determinate vacuum level, issuing a second command for said valve drive system to switchover said vacuum switching valve so as to connect said diaphragm means to the intake manifold of the engine; and

further comprising an electronic control routine system which includes means for detecting first and second values of a flag, a first subrouting system which operates said third means for issuing said first command as long as said flag has said first value, and a second subroutine system which operates said fourth means for issuing said second command as long as said flag has said second value, said third means setting said flag to said second value upon issuance of said first command, and said fourth means setting said flag to said first value upon issuance of said second command.

4,694,795

GOVERNOR MECHANISM

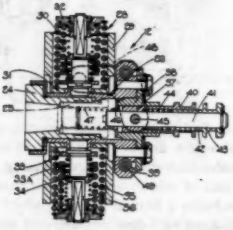
Domingo C. Pruneda, Barcelona, Spain, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Feb. 3, 1986, Ser. No. 825,654

Claims priority, application Spain, Feb. 6, 1985, 540.158

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—373 **8 Claims**



1. A governor mechanism for attachment to a fuel injection pump for an internal combustion engine, the governor mechanism being of the two speed type and comprising a centrifugal weight mechanism, a pivotal lever coupled to the weight mechanism and to an output member which in use is connected to a fuel control rod of the pump, the mechanism including a manually operable member connected to an adjustable pivot for the lever, and the governor mechanism including resilient means opposing movement of the centrifugal weight mechanism, the arrangement being such that the governor mechanism will control the idling speed and the maximum speed of the associated engine, the rate of fuel supply intermediate these speeds being controlled by the position of said manually operable member, the mechanism further including a maximum fuel stop to limit the maximum rate at which fuel can be supplied to the associated engine, said weight mechanism including a further output member which moves in accordance with the speed at which the mechanism is driven, a fluid pressure operable servo responsive to the movement of said further output member, a cam the position of which is varied by said servo and a lever mechanism including a follower engaging said cam, said lever mechanism acting to determine the setting of said maximum fuel stop, wherein the servo includes a piston coupled to said cam, and a servo valve member slidable within said piston for controlling the application of fluid under pressure to said piston, said piston and said valve member forming a follow up servo mechanism.

4,694,796

SYSTEM AND METHOD FOR CONTROLLING FUEL SUPPLY TO A VEHICULAR INTERNAL COMBUSTION ENGINE WITH FUEL SUPPLY CUTOFF FUNCTION

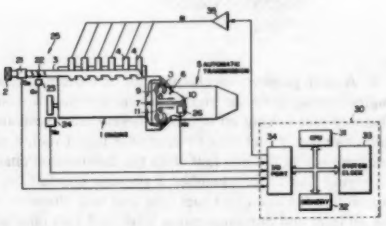
Yasushi Mori, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 8, 1986, Ser. No. 861,008

Claims priority, application Japan, May 10, 1985, 60-99268

Int. Cl.[4] F02D *41/12*

U.S. Cl. 123—325 **19 Claims**



1. A system for a vehicular internal combustion engine, comprising:

(a) first means for detecting whether the engine has entered a predetermined deceleration state;

(b) second means for measuring a magnitude of the engine deceleration when the engine has entered the predetermined deceleration state;

(c) third means for varying a first predetermined threshold value defining a cutoff zone of fuel supplied to the engine and at which the cutoff of fuel supply to the engine is initiated so as to provide an optimum range of the cutoff zone according to the measured magnitude of engine deceleration; and

(d) fourth means for learning the variation of the first predetermined threshold value and storing the first predetermined threshold value varied in said third means, the learned and stored first predetermined threshold value thereby being used as the first predetermined threshold value in said third means.

16. A method for a vehicular internal combustion engine, comprising the steps of:

(a) detecting whether the engine has entered a predetermined deceleration state;

(b) measuring a magnitude of the engine deceleration when detecting that the engine has entered the predetermined deceleration state in said step (a);

(c) varying a first predetermined threshold value defining a cutoff zone of fuel supplied to the engine and at which the cutoff of fuel supply to the engine is initiated so as to provide an optimum range of the cutoff zone according to the measured magnitude of engine deceleration in said step (b); and

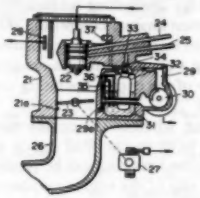
(d) learning the variation of the first predetermined threshold value and storing the first predetermined threshold value varied in said step (c), the learned and stored first predetermined threshold value being used as the first predetermined threshold value in said step (c).

4,694,797

FUEL SUPPLY SYSTEM FOR INTERNAL COMBUSTION ENGINE

Kyugo Hamai, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Oct. 22, 1986, Ser. No. 921,769
Claims priority, application Japan, Oct. 23, 1985, 60-235427
Int. Cl.[4] F02M *3/07, 3/12*
U.S. Cl. 123—339 **7 Claims**



1. A fuel supply system for an internal combustion engine, comprising:

a throttle body having a throttle bore;

a throttle valve disposed in said throttle bore;

a fuel injector disposed upstream of said throttle valve for injection of fuel into said throttle bore;

auxiliary air passage means formed in said throttle body for providing communication between portions of said throttle bore upstream and downstream of said throttle valve;

an idle speed control valve disposed in said auxiliary air passage means for controlling the flow rate of auxiliary air passing therethrough and thereby achieving a predetermined idle speed;

fuel storage chamber means formed in said throttle body for storing therewithin a predetermined quantity of fuel; and

idle fuel pickup passage means having an end projecting into the fuel within said fuel storage chamber means and the other end communicated with said auxiliary air passage means for drawing fuel thereinto from said fuel storage chamber means and supplying it into said auxiliary air passage means.

4,694,798

AUTOMOTIVE ENGINE IDLING SPEED CONTROL SYSTEM WITH VARIABLE IDLING SPEED DEPENDING UPON COOLING AIR TEMPERATURE IN AUTOMOTIVE AIR CONDITIONING SYSTEM

Masaki Kato, Tokyo, and Tsutomu Yamazaki, Atsugi, both of Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Mar. 12, 1986, Ser. No. 838,817
Claims priority, application Japan, Mar. 15, 1985, 60-50610
Int. Cl.[4] F02M *3/00;* **B60H** *1/32*
U.S. Cl. 123—339 **7 Claims**

1. An idling speed control system for an automotive internal combustion engine associated with an air conditioning system, comprising:

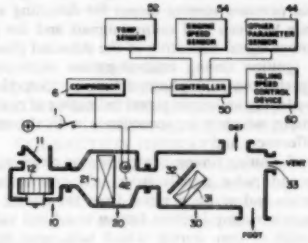
a cool air source in said air conditioning system, said cool air source being driven by said internal combustion engine for producing cool output air;

an engine idling control means including an electrically operated actuator for adjusting an idling speed of the engine;

a first sensor monitoring a basic engine idling control parameter and producing a first sensor signal indicative of the basic engine idling control parameter;

a second sensor associated with said cool air source in said air conditioning system for monitoring the output air temperature of said cool air source and producing a second sensor signal indicative of the air cool source output temperature; and

a controller deriving a basic engine idling speed based on said first sensor signal and deriving a basic control signal indicative of the basic engine idling speed, and said controller being responsive to an air conditioning mode selector for deriving a correction value for said basic engine



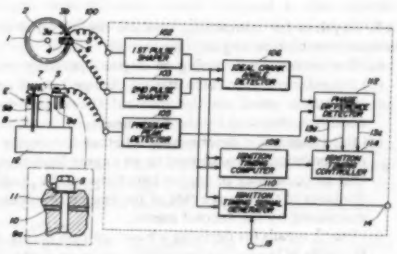
idling speed based on said second sensor signal when air conditioning is selected on said air conditioning mode selector so as to adjust said output air temperature to a given value, which correction value varies with said second sensor signal value from a maximum value when air conditioning is initially selected on said mode selector through a decreasing range to a lower final value as said output air temperature of said cool air source decreases, and modifying said basic control signal by said correction value to derive a modified control signal for controlling said actuator so as to adjust the engine idling speed to a speed corresponding to the basic idling speed modified by said correction value.

4,694,799

IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

Shizuo Yagi, Asaka; Yoshiaki Hirosawa, Shiki; Makoto Kawai, Tokorozawa, and Isao Fujii, Hasuda, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1985, Ser. No. 787,750
Claims priority, application Japan, Oct. 16, 1984, 59-215204
Int. Cl.[4] F02P *5/14, 41/22*
U.S. Cl. 123—425 **5 Claims**



1. An ignition timing control system for an internal combustion engine having a crankshaft, at least one cylinder, and a starter, said system comprising:

crank angle detecting means for producing a first pulse signal indicative of a reference crank angle position of the

crankshaft and a second pulse signal indicative of a crank angle position that changes constantly with rotation of the crankshaft;

ideal crank angle detecting means receiving the first and second pulse signals from said crank angle detecting means for producing an output signal indicative of an ideal crank angle position at which pressure internal of the cylinder of the engine attains a peak value;

pressure sensing means for sensing the peak value of pressure internal of the cylinder which exceeds a predetermined value and for producing an output signal indicative of the sensed peak value of pressure;

phase difference detecting means receiving the output signals from said ideal crank angle detecting means and from said pressure sensing means for detecting a phase difference between said output signals and for producing an output signal indicative of the detected phase difference;

first ignition timing control means receiving the output signal from said phase difference detecting means for producing an output signal indicative of optimum ignition timing which is in accordance with the detected phase difference; and

second ignition timing control means receiving the first and second pulse signals from said crank angle detecting means and an input signal from the starter of the engine for controlling ignition timing to a fixed value only for a period of time during which said input signal indicates actuation of the starter.

4,694,800

SYSTEM AND METHOD FOR CONTROLLING IGNITION TIMING FOR AN INTERNAL COMBUSTION ENGINE

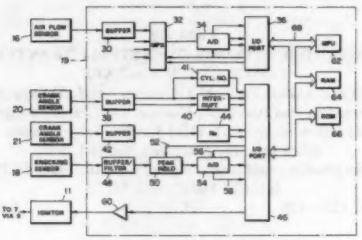
Tatsuo Morita, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan

Filed Oct. 22, 1986, Ser. No. 921,490

Claims priority, application Japan, Oct. 22, 1985, 60-235815

Int. Cl.[4] F02P 5/04

U.S. Cl. 123—425 **11 Claims**



1. a system for controlling ignition timing for a vehicular internal combustion engine, comprising:

(a) first means for detecting an engine operating condition;

(b) second means for calculating a change rate of an engine revolution speed on the basis of the engine operating condition detected by the first means;

(c) third means for determining whether the engine operating condition is trnasferred to an engine load region such that an occurance of engine knocking can be predicted on the basis of the change rate of the engine revolution speed calculated by the second means;

(d) fourth means for deriving a basic ignition timing angle on the basis of the engine operating condition detected by the first means;

(e) fifth means for setting a first correction coefficient on the basis of which the basic ignition timing angle derived by the fourth means is corrected when the third means determines that the engine operating condition is transferred to the engine load region;

(f) sixth means for detecting whether a knocking is generated in the engine;

(g) seventh means for calculating an ignition timing angle correction amount for correcting the basic ignition timing angle drived by the fourth means on the basis of the first correction coefficient set by the fifth means when the sixth means detects the engine knocking so that the ignition timing is immediately corrected toward a retardation angle side;

(h) eighth means for correcting the basic ignition timing angle derived by the fourth means according to the ignition timing angle correction amount calculated by the seventh means; and

(i) ninth means for igniting air-fuel mixture supplied to each engine cylinder at an ignition timing angle corrected by the eighth means.

11. A method for controlling ignition timing for a vehicular internal combustion engine, comprising the steps of:

(a) detecting an engine operating condition;

(b) calculating a change rate of an engine revolution speed on the basis of the engine operating condition detected in the step (a);

(c) determining whether the engine operating conditon is transferred to an engine load region such that the occurence of engine knocking can be predicted on the basis of the change rate of the engine revolution speed calculated in the step (b);

(d) deriving a basic ignition timing angle on the basis of the engine operating conditon detected in the step (a);

(e) setting a correction coefficient on the basis of which the basic ignition timing angle derived in the step (d) is corrected when determining that the engine operating condition is transferred to the engine load region;

(f) detecting whether a knocking is generated in the engine;

(g) calculating an ignition timing angle correction amount for correcting the basic ignition timing angle derived in the step (d) on the basis of the correction coefficient;

(h) correcting the basic timing angle derived in the step (d) according to the ignition timing angle correction amount calculated in the step (g); and

(i) igniting air-fuel mixture supplied to each engine cylinder at an ignition timing corrected in the step (h).

4,694,801

SYSTEM FOR CONTROLLING THE IGNITION TIMING OF AN INTERNAL COMBUSTION ENGINE

Masaaki Nagai, Fuchu, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,431

Claims priority, application Japan, Dec. 28, 1984, 59-280552

Int. Cl.[4] F02P 5/14

U.S. Cl. 123—425 **7 Claims**

2. A system for controlling the ignition timing of an internal combustion engine having a microprocessor and an ignition timing control device comprising:

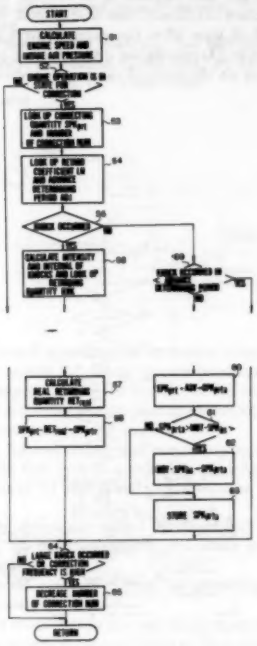
sensing means for sensing operating conditions of the engine and for producing an engine operating condition signal;

a knock sensor for sensing engine knock and for producing a knock signal;

first means responsive to the engine operating condition signal and knock signal for producing an ignition timing correcting signal representing an ignition timing correcting quantity at a time for deciding the ignition timing;

second means for detecting frequency of ignition timing

correction higher than a predetermined value and producing a correction signal; and



third means responsive to the correction signal for increasing the ignition timing correcting quantity.

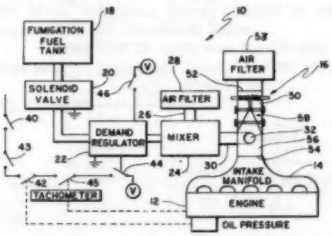
4,694,802
COMPRESSION IGNITION ENGINE FUMIGATION SYSTEM

Alvin Lowi, Jr., 2146 Toscanini Dr., San Pedro, Calif. 90732

Filed Sep. 21, 1984, Ser. No. 652,937

Int. Cl.[4] F22B *37/18, 9/08;* **F22D** *1/00*

U.S. Cl. 123—431 **23 Claims**



1. A variable area venturi apparatus for variably metering a constant proportion fumigation fuel/air mixture into a main air flow supplied to a compression ignition engine having an intake manifold, comprising:

a housing defining an inner surface and having an air intake port, an output port for being coupled to the intake manifold, a main passageway between the air intake port and the output port through which the main air flow to the engine occurs, and a branch port coupled for enabling the constant proportion fumigation fuel/air mixture to be drawn into the main passageway to be variably mixed with the main air flow;

a variable restrictor means in the main passageway defining a variable area throat, the restrictor mean variably opening and closing to open and close the throat in response to air flow drawn through the main passageway by the engine for creating a variable pressure drop downstream of the throat, the branch port being positioned between the throat of the restrictor means and the intake manifold, the amount of constant proportion fumigation fuel/air mixture being drawn into the main passageway varying in response to the variable pressure drop to vary the proportion of fumigation fuel mixed with air supplied to the intake manifold.

4,694,803
AIR-FUEL RATIO CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE WITH AN ATMOSPHERIC PRESSURE RESPONSIVE CORRECTION OPERATION

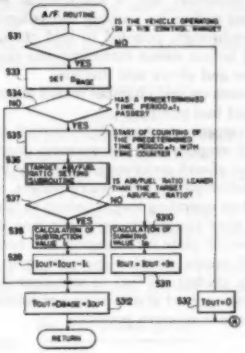
Masahiko Asakura, Tokorozawa; Tomohiko Kawanabe, Utsunomiya; Masahiro Ueda, Asaka; Shinichi Kubota, Nagareyama; Noritaka Kushida, Tokyo, and Yukihiro Matsumoto, Fujimi, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 10, 1986, Ser. No. 819,454

Claims priority, application Japan, Apr. 16, 1985, 60-081178; Apr. 16, 1985, 60-081179

Int. Cl.[4] F02B *3/00*

U.S. Cl. 123—440 **5 Claims**



1. An air-fuel ratio control system for an internal combustion engine mounted on a vehicle, comprising:

an oxygen concentration sensor disposed in the exhaust passage of said interal combustion engine and producing an output signal whose level increases and decreases generally in proportion to an oxygen concentration of the exhaust gas flowing through said exhaust passage;

atmospheric pressure detecting means for detecting the atmospheric pressure exerted on said vehicle;

target air-fuel ratio determining means for determining a target air-fuel ratio in accordance with preselected operational parameters of said engine, and for correcting the target air-fuel ratio in accordance with the detected atmospheric pressure;

comparing means for comparing the level of the output signal of said oxygen concentration sensor with said corrected target air-fuel ratio; and

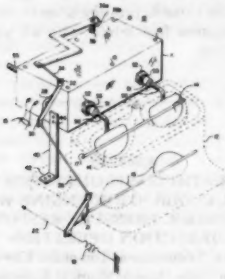
feedback means for controlling the air-fuel ratio of an air-fuel mixture to be supplied to said engine in response to the result of the comparison by said comparing means toward the corrected target air-fuel ratio.

4,694,804

FUEL INJECTION APPARATUS FOR AUTOMOBILE

Torey W. DeGrazia, Jr., 1014 S. Greenwood, Park Ridge, Ill. 60068

Filed May 28, 1985, Ser. No. 738,422
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—462 **4 Claims**



1. A fuel injection adapter for use on a vehicle including a carburetor having a throat, a fuel pump, a throttle and a throttle control lever, comprising:

chamber means adapted for mounting adjacent said carburetor;

metering jet means, including an orifice with different size internal diameters and a longitudinal needle movable within said orifice for varying the volume of fuel delivered therethrough, coupled to said chamber means and including nozzle means extending into said throat of said carburetor and above said throttle;

fuel inlet means on said chamber means adapted for connection to said fuel pump;

adjustment means mechanically coupled to said throttle lever and responsive to movement thereof to control movement of said metering jet means to vary the amount of fuel delivered by said nozzle means, said adjustment including an operating lever coupled to said throttle lever, a needle plate coupled to said operating lever and means on said needle plate for engaging said needle; and

fuel shutoff means coupled in series with said fuel inlet means for cutting off fuel to said chamber means when said operating lever is moved to a position corresponding to a throttle wide-open position.

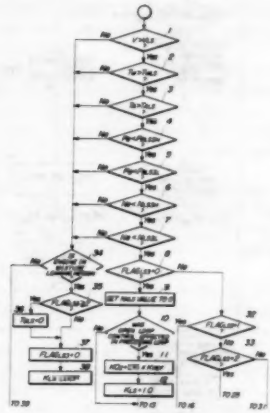
4,694,805

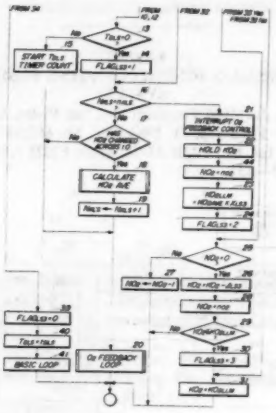
AIR-FUEL RATIO CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Fumio Yatabe, and Yoshio Wazaki, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Sep. 17, 1986, Ser. No. 908,310
Claims priority, application Japan, Sep. 19, 1985, 60-207292; Sep. 19, 1985, 60-207293
Int. Cl.[4] F02D *41/14*
U.S. Cl. 123—489 **9 Claims**

1. A method of effecting feedback control of the air-fuel ratio of an air-fuel mixture being supplied to an internal combustion engine having an exhaust passage and means arranged in said exhaust passage for detecting the concentration of an exhaust gas ingredient, by correcting a basic fuel supply quantity by the use of a correction coefficient variable in value in response to an output from said means for detecting the exhaust gas ingredient concentration, when said engine is operating in a feedback control region, the method comprising the steps of: (1) providing a low-load operating region of said engine lying outside said feedback control region and defined by at least one parameter representing load on said engine; (2) determining, when the engine enters said low-load operating region, a value of said correction coefficient in response to the output from said means for detecting the exhaust gas ingredient concentration and also calculating an average value of values of said correction coefficient thus determined, for a predetermined period of time after the engine enters said low-load operating region; (3) calculating a target value of said correction coefficient on the basis of the average value obtained in said step (2), said target value yielding a predetermined air-fuel ratio leaner than a stoichiometric mixture ratio; (4) varying the value of said correction coefficient after the lapse of said predetermined period of time and until it becomes equal to said target value while the engine remains in said low-load operating region; and (5) correcting said basic fuel supply quantity by the use of the value of said correction coefficient thus varied.



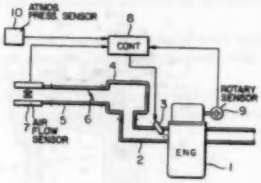


4,694,806

FUEL CONTROL APPARATUS FOR ENGINE

Seiji Wataya; Setsuhiro Shimomura, and Yukinobu Nishimura, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 18, 1986, Ser. No. 897,334
Claims priority, application Japan, Aug. 20, 1985, 60-182701
Int. Cl.[4] F02B *3/00*
U.S. Cl. 123—494 **5 Claims**



1. A fuel control apparatus for an engine comprising:

an air flow sensor for detecting and producing an output representing the intake air amount of the engine,

a sensor for detecting and producing an output representing the operating state of the engine,

a controller for calculating and producing an output representing the fuel supply amount in accordance with the output signals of said sensors to determine the optimum value,

fuel injecting means controlled by the output signal of the controller for injecting fuel to the intake passage of the engine, and

an atmospheric pressure sensor for detecting the atmospheric pressure,

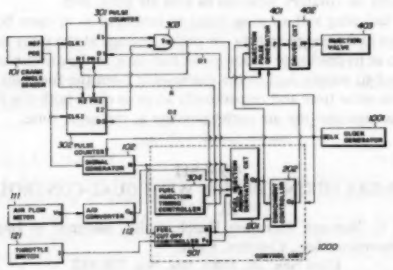
wherein said controller in the operating range of the engine where the detected output of said air flow sensor does not exhibit the true value of the intake air amount due to the reverse-flow of the intake air of the engine, sets at least one upper limit value Qn of the intake air amount in response to the operating state of the engine, and wherein said upper limit value is corrected by the atmospheric pressure detected by said atmospheric pressure sensor.

4,694,807

FUEL INJECTION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH ASYNCHRONOUS FUEL INJECTION FOR FUEL SUPPLY RESUMPTION FOLLOWING TEMPORARY FUEL CUT-OFF

Yasushi Mori, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 28, 1985, Ser. No. 737,940
Claims priority, application Japan, May 29, 1984, 59-107588
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—501 **25 Claims**



1. A fuel injection control system for an internal combustion engine comprising:

a first sensor producing a first sensor signal representative of the angular position of the crank shaft;

a second sensor producing a second sensor signal representative of preselected engine operating parameters;

a third sensor detecting whether engine operating conditions satisfy a predetermined fuel cut-off condition and if so, producing a third sensor signal;

fourth means for deriving a fuel injection amount on the basis of a value of said second sensor signal and producing a fuel injection control signal having a value indicative of the derived fuel injection amount;

fifth means for disabling said fourth means in the presence of said third sensor signal and for resumption operation of said fourth means after said third sensor signal ends, said fifth means modifying said fuel injection signal value to a given degree for the first fuel injection upon resumption of the operation of said fourth means;

sixth means for deriving fuel injection timing and producing an injection timing control signal, said sixth means normally deriving said fuel injection timing on the basis of said first sensor signal so as to perform fuel injection at a predetermined angular position of said crank shaft, and producing said injection timing signal independently of the crank shaft angular position upon termination of said third sensor signal, and

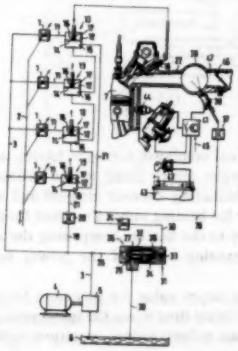
wherein said first sensor signal includes a first pulse train representative of predetermined angular positions of said crank shaft and a second pulse train representative of predetermined units of rotation of the crank shaft, and said sixth means counts the pulses of said first and second pulse trains, produces said injection timing signal when a first counter value of said first pulses reaches a given value and a second counter value of said second pulses reaches a second given value, and presets said first and second counter values to said first and second value in response to said third sensor signal.

4,694,808

METHOD AND FUEL INJECTION SYSTEM FOR FUEL SUPPLY TO A MIXTURE-COMPRESSING INTERNAL COMBUSTION ENGINE HAVING EXTERNALLY SUPPLIED IGNITION

Klaus-Jürgen Peters, Affalterbach, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 20, 1982, Ser. No. 410,099
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1981, 3140948
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—453 **9 Claims**



1. A method for supplying fuel to a mixture-compressing internal combustion engine having an air intake tube and exter-

nally supplied ignition by means of a fuel injection system having metering valve means disposed in a fuel supply line for metering a quantity of fuel at a specific proportion to the quantity of air aspirated by said engine, a control pressure line communicating with said fuel supply line, and having individual injection valve means, comprising the steps of:

injecting the metered fuel ahead of each cylinder of said engine; and

further injecting fuel into the air-intake tube of said engine by means of a supplementary injection valve means in accordance with engine operating characteristics, whereby the pressure in said control pressure line is reduced by means of said supplementary injection valve means, and the pressure difference at said metering valve means is increased to thereby increases the metered fuel quantity transmitted by means of said individual injection valve means.

4,694,809

METHOD AND SYSTEM FOR INTERNAL COMBUSTION ENGINE OXYGEN SENSOR HEATING CONTROL WITH TIME SMOOTHING

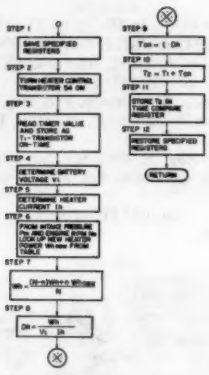
Jiro Nakano; Takao Ishibashi; Takao Akatsuka, and Masao Kawaguchi, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 666,466, Oct. 30, 1984, abandoned. This application Aug. 15, 1986, Ser. No. 898,783

Claims priority, application Japan, May 7, 1984, 59-90881

Int. Cl.[4] F02M *51/00, 7/00;* **G01V** *27/26;* **C25B** *1/24*

U.S. Cl. 123—489 **5 Claims**



1. In an internal combustion engine having an exhaust system and an oxygen sensor fitted to the exhaust system, the oxygen sensor including a sensor element and an electrically-powered heater for heating same, a method for controlling the electrical supply to the heater, comprising the steps of:

storing the existing value of the power supplied to the heater;

determining a target value for power to be supplied to the heater at a future time when the temperature of the engine exhaust gases reflects values consistent with engine operating parameters;

delaying the application of the full value of said target value until said future time; and

recycling to said storing step.

4,694,810

FUEL COCK FOR AN INTERNAL COMBUSTION ENGINE

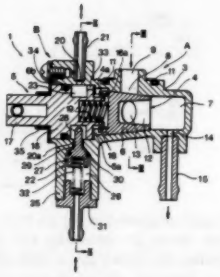
Yasuhiko Miyamoto, Ohmiya, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1985, Ser. No. 813,106

Claims priority, application Japan, Dec. 28, 1984, 59-278473

Int. Cl.[4] F02M *37/02;* **F16K** *5/02*

U.S. Cl. 123—516 **7 Claims**



1. A fuel cock for an internal combustion engine comprising:

a valve body having a tapered bore portion and a cylindrical bore portion, said tapered bore portion having a fuel inlet port and a fuel outlet port, said cylindrical bore portion having an air inlet port and an air outlet port;

said fuel inlet port and fuel outlet port being communicated with a bottom of a fuel tank and a carburetor, respectively, said air inlet port being communicated with a vent passage of the fuel tank;

an air outlet passage provided in said valve body being communicated with the atmosphere and said air inlet port;

a fuel plug, having a large diameter portion at one end thereof and a small diameter portion at an opposite end thereof and a tapered periphery between said ends, rotatably engaged in the tapered bore portion of the valve body so as to selectively close and open a fuel passage between the fuel inlet port and the fuel outlet port and axially displaceable in the tapered bore portion so as to serve as a piston;

an air plug having a cam portion and said air plug being positioned adjacent the large diameter portion of the fuel plug defining a chamber therebetween and rotatably engaged in the cylindrical bore portion;

said air plug forming a passage so as to apply fluid pressure at the air inlet port to the chamber to urge the fuel plug towards the small diameter end of said fuel plug;

valve means mounted in said air outlet passage including a projection slidably engaged with said cam portion to selectively close and open said air outlet passage dependent on rotatary position of said air plug; and

the fuel plug and air plug being so arranged as to open both the fuel passage and the air outlet passage at the same time so as to discharge vapor in the fuel tank to the atmosphere and to supply fuel to the carburetor from the fuel tank at the same time and respectively so as to close both the fuel passage and the air outlet passage at the same time.

4,694,811

AIR-GAS MIXING DEVICE WITH DUAL-CONTROL FUEL VALVE

David E. Bennett, Hermosa Beach, Calif., assignor to Impco Carburetion, Inc., Cerritos, Calif.

Filed Sep. 20, 1985, Ser. No. 778,482

Int. Cl.[4] F02B *43/00*

U.S. Cl. 123—527 **19 Claims**

1. An air gas mixing device of the type used to mix gaseous

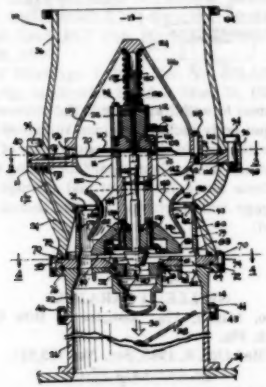
fuel with air as an air/fuel mixture for discharge into an air intake conduit means of an internal combustion engine, comprising:

a housing having an air duct extending through the housing, the air duct having an air inlet and an air-fuel mixture discharge outlet downstream of the air inlet in the direction of fluid flow, the housing arranged to be connected to the air intake conduit means of the engine so that the discharge outlet of the air duct is in communication with said intake conduit means;

an air valve for controlling the rate of air flow through said air duct;

a primary fuel inlet in communication with said air duct for delivery of gaseous fuel for mixture with air flowing through said air duct;

a fuel valve for controlling the rate of fuel flow through said fuel inlet, the fuel valve having open and closed positions,



and the rate of fuel being delivered through said fuel inlet being dependent on the degree to which said fuel valve is opened;

a first fuel valve actuator means automatically operated by a remote first fuel valve control signal for moving the fuel valve in an open position to a predetermined degree in response to the first fuel valve control signal; and

a second fuel valve actuator means automatically operated by a remote second fuel valve control signal for adjusting the opening of the fuel valve independently of and relative to the first fuel valve actuator means in response to the second control signal whereby the fuel valve is opened to a predetermined degree by said first actuating means in response to said first control signal and the opening thereafter adjusted by said second actuating means in response to said second control signal to provide an optimum fuel delivery rate.

4,694,812

EXHAUST GAS RECIRCULATION VALVE HAVING INTEGRAL ELECTRONIC CONTROL

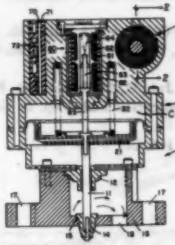
David L. Wendt, Janesville, Wis., assignor to SSI Technologies, Inc., Janesville, Wis.

Filed Apr. 21, 1986, Ser. No. 853,964

Int. Cl.[4] F02M *25/06*

U.S. Cl. 123—571 **9 Claims**

1. Exhaust gas recirculating apparatus for delivering a variable quantity of exhaust gas from an engine exhaust to its air intake, said apparatus comprising a casing having therein a subatmospheric pressure chamber in communication with a source of relatively low air pressure; passage means through which exhaust gas may flow; valve means movable between positions in which the flow of said exhaust gas through said passage is enabled and disabled; adjusting means coupled to said valve means for adjusting the position of the latter in response to pressure changes in said chamber; constant restriction means interposes between said chamber and said source and in communication with each for permitting a continual leak of air from said chamber to said source; pilot valve means interposed between said chamber and a source of ambient air at



atmospheric pressure; adjustable flow control means in said pilot valve means for varying the quantity of air that may pass through said pilot valve; and operating means coupled to said flow control means and responsive to electrical control signals to adjust said flow control means.

4,694,813

PISTON FOR INTERNAL COMBUSTION ENGINES

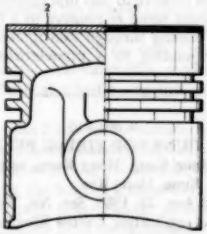
Siegfried Mielke, Neckarsulm, Fed. Rep. of Germany, assignor to Kolbenschmidt AG, Neckarsulm, Fed. Rep. of Germany

Filed Feb. 5, 1985, Ser. No. 698,289

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1984, 3404284

Int. Cl.[4] F02F *3/12*

U.S. Cl. 123—668 **6 Claims**



1. In a piston for an internal combustion engine, comprising a cover layer which has been applied to the piston head by plasma spraying or flame spraying and consists of a material having a relatively low thermal conductivity, the improvement wherein said cover layer comprises a material of thermal conductivity of $\lambda \leqq 2$ W/mK., and has a thickness of 0.5 to 2 mm and a peak-to-valley height of only 5 to 30 μm.

4,694,814

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES WITH A MAGNET GENERATOR

Lothar Gademann, Rottenburg; Adam Hirt, Ammerndorf; Hartmut Michel, Reutlingen; Hans-Dieter Schmid, Nuremberg, and Michael Schneider, Reutlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

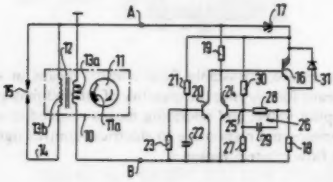
PCT No. PCT/DE85/00258, § 371 Date Feb. 21, 1986, § 102(e) Date Feb. 21, 1986, PCT Pub. No. WO86/03259, PCT Pub. Date Jun. 5, 1986

PCT Filed Jul. 31, 1985, Ser. No. 852,806

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443739

Int. Cl.[4] F02P *3/12*

U.S. Cl. 123—644 **7 Claims**



1. Ignition system for internal combustion engines comprising a magnet generator provided with an ignition armature cooperating with a rotary magnet system driven by an internal combustion engine to generate voltage half waves of opposite polarity, the ignition armature including a secondary winding connectable to an ignition plug and a primary winding connected to a primary current circuit, the primary current circuit comprising an electronic ignition switching element responsive to voltage half waves of one polarity and having a control electrode, a control circuit coupled to said control electrode for switching-over at an ignition time point said ignition switching element from a conductive state to a blocking state whereby an ignition voltage is induced in said secondary winding, said control circuit including a first control subcircuit provided with first timing means for triggering the switch-over of said ignition switching element at a first ignition time point, said first timing means being responsive to a frequency of said voltage half waves corresponding to a predetermined lower speed range, and a second control subcircuit provided with second timing means for triggering the switch-over of said ignition switching element at a second ignition time point which is advanced relative to said first ignition time point, said second timing means being responsive to a frequency of current half waves passing through said ignition switching element and corresponding to a predetermined upper speed range.

4,694,815

TOY GUNS FOR FIRING PELLETS

Lam H. Hung, Hong Kong, Hong Kong, assignor to Longreen Limited, Hong Kong, Hong Kong

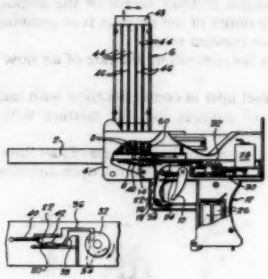
Filed Aug. 23, 1985, Ser. No. 768,797

Claims priority, application United Kingdom, Jul. 29, 1985, 8519051

Int. Cl.[4] F41B *7/08, 11/02*

U.S. Cl. 124—27 **12 Claims**

8. A toy gun for firing pellets having a barrel extending forwardly from a gun body; an hand grip attached to the body adjacent a trigger for activating a firing mechanism; and means for delivering pellets seriatim to substantially the same point in the barrel for firing, the firing mechanism comprising a motor coupled through a gear train to drive a pinion bearing two posts eccentrically mounted on a common diameter thereof; an arm mounted for reciprocal motion parallel to the axis of the barrel; means continuously biasing the arm forwardly towards the distal end of the barrel, the arm having a portion extending perpendicularly to said barrel axis for alternate engagement with the posts as the pinion rotates, a post engaging said portion at the end of each forward stroke of the arm and releasing it at the end of each rearward stroke; a cam follower pivotally mounted on the forward end of the arm for selective coupling



to a firing hammer to withdraw same in the rearward stroke of the arm, the gun body including a cam surface which pivots the follower at the end of the rearward stroke of the arm to release the hammer, and resilient means for urging the hammer upon such release along the barrel and through said point therein to engage and discharge a pellet thereat forwardly from the barrel.

4,694,816

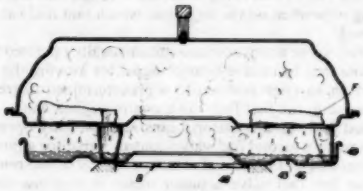
GRILLE APPARATUS

Miguel Fabbro, Miami, Fla., assignor to Bifa Corporation, Miami Beach, Fla.

Filed Oct. 8, 1985, Ser. No. 785,531

Int. Cl.[4] A47J *37/00*

U.S. Cl. 126—41 R **5 Claims**



1. A grille apparatus for cooking food with electric or gas stove burners, comprising:

A. a base member having substantially the shape of a plate with a central opening of sufficiently large dimensions to house said burners and further having an inner upwardly extending flange around the periphery of said central opening and an outer upwardly extending flange around the outer periphery of said plate so that a channel is defined outside the heating range of said burners and further including sufficient water to substantially fill said channel;

B. a grille assembly having substantially the shape of a plate including a center hole having substantially the same dimensions as said central opening and said grille assembly includes a plurality of orifices scattered throughout so that the grease of said food resting on said grille assembly may drip down to said water filled channel and further including a plurality of spacer members mounted to the underside of said grille assembly so that a space apart relationship is kept between said assembly and said base member; and

C. a cover member being of slightly smaller dimensions than said grille assembly and which interfits with said grill

assembly so that it can tightly cover said food thereby allowing the heated air entering the central opening of the base member to cook food placed upon the grill assembly and retain the heat in the apparatus.

4,694,817

HEATING STOVE AND METHOD FOR THE COMBUSTION OF FUELS IN HEATING STOVES

Sture Nilsson, Blå Grind, S-599 00 Ödeshög, Sweden

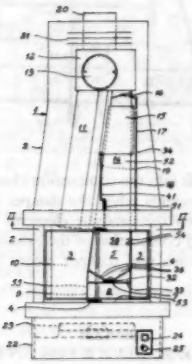
PCT No. PCT/SE85/00149, § 371 Date Dec. 10, 1985, § 102(e) Date Dec. 10, 1985, PCT Pub. No. WO85/04464, PCT Pub. Date Oct. 10, 1985

PCT Filed Apr. 1, 1985, Ser. No. 828,323

Claims priority, application Sweden, Mar. 30, 1984, 8401770

Int. Cl.[4] F24B *5/00*

U.S. Cl. 126—76 **18 Claims**



1. A heating stove comprising a fireplace (**5**) having front and rear walls and a pair of opposed lateral walls (**54, 55**) and a hearth (**6**) located at an intermediate height within the fireplace and dividing the fireplace into an upper chamber above the hearth, and a space (**8**) below the hearth, said hearth having grate means (**7**) for supporting fuel while allowing combustion products to pass through the hearth; a flue (**20**); a first duct (**11**) having one end connected to the flue; means comprising aperture means (**9**) in one of said walls providing communication between said space (**8**) below the hearth and the first duct (**11**) for the passage of combustion products from said space (**8**) to the flue (**20**); a second duct (**14**) having one end connected to said flue (**20**) and having its other end in communication with the upper chamber; a damper (**16**) in the second duct; a firepalce opening in the front wall of the fireplace leading to the upper chamber above the hearth; hatch means (**3**) for closing the fireplace opening; linkage means (**17**), connected to the damper and operable by the hatch means for closing the damper when the hatch means is closed and opening the damper when the hatch means is open; and means for substantially limiting the draft through the grate to flow in the downward direction when the damper and hatch means are closed, whereby the combustion products flow from the space (**8**) below the grate outwardly through said aperture (**9**) and through the first duct (**11**) to the flue (**20**).

4,694,818

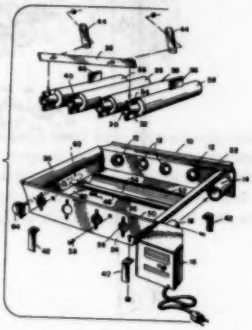
FIREPLACE GRATE FOR GAS FIRED FIREPLACE INCLUDING FORCED AIR HEAT EXCHANGER

Jon Bridgwater, Morton, Ill., assignor to Morton Metalcraft Company, Morton, Ill.

Filed Aug. 7, 1986, Ser. No. 893,965

Int. Cl.[4] F24B *7/00*

U.S. Cl. 126—121 **6 Claims**



1. An improved fireplace heat transfer unit for placement in a fireplace of the type having a floor, a back wall, and a front opening, said unit comprising, in combination:

a forced air fed distribution manifold adapted to extend across the rear of a fireplace substantially parallel to the back wall thereof;

a series of heat transfer conduits each defining a respective heat transfer chamber connected with said manifold extending therefrom toward the fireplace opening and including an emission orifice for jetting air directly into a room;

a generally rectangular frame having a rear member defined by the manifold, opposite side members and a front member for supporting the heat transfer conduits;

means for supporting the frame above the floor;

an air supply tube connected to the manifold;

blower means for forcing air through said tube into the manifold, then through the conduits and from the emission orifices, said blower means being positioned within the fireplace front opening when the unit is operating;

a plurality of synthetic, non-flammable, model combustibles supported on the heat transfer conduits generally above the frame;

a pan supported by the frame at the bottom of the frame and beneath the heat transfer conduits to define an enclosure which has the frame forming the sides thereof and the pan generally forming the bottom thereof with the top being generally open, said heat transfer conduits extending through the enclosure from the manifold;

gas supply means including a gas burner tube, said burner tube generally transverse to the heat transfer conduits and supported by the pan intermediate the rear and front members of the frame and below the conduits comprising means for providing a gas supply for ignition and burning of gas in the region of the transfer conduits and the model combustibles; and

a layer of sand covering the gas burner tube for dispersal of gas discharged from the tube to within the enclosure defined by the frame for combustion within the enclosure around the tubes and also around the model combustibles.

4,694,819

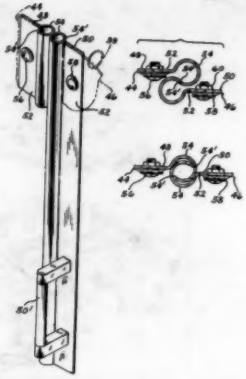
LOCKING MEANS FOR FIREPLACE SCREEN

Donald L. Shaffer, R.R. 2, Box 399, Scottsburg, Ind. 47170

Filed Aug. 27, 1986, Ser. No. 900,682

Int. Cl.[4] F24C *15/10*

U.S. Cl. 126—140 **6 Claims**



1. A fireplace screen fixture for assembly to the front face of a fireplace opening, said fixture comprising:

a. a frame capable of outlining a fireplace opening, and having a supporting rod suspended transversely across the upper portion of the frame from one side to the other, and a plurality of ring members threaded onto the supporting rod and capable of sliding along the length thereof; and

b. a pair of wire screen curtains suspended at their upper portions from the said ring members, and movable away from each other to a folded-away open position, as well as being movable toward each other to a stretched closed position capable of stretching across the fireplace opening;

c. the invention comprising a sheet metal locking strip attached to the vertical mating side edge of each screen curtain, so that when the two screen curtains are overlapped and stretched closed these two locking strips are interlocked with each other to form a bond that will prevent these two screen curtains from being opened inadvertently until these two interlocking strips are purposely disengaged from each other by human intervention.

4,694,820

STOVE WITH CATALYTIC CONVERTER

Carrol E. Buckner, 5 Piney Dr., Fletcher, N.C. 28732

Filed Dec. 15, 1986, Ser. No. 941,358

Int. Cl.[4] F23V *15/00;* **F23L** *11/00*

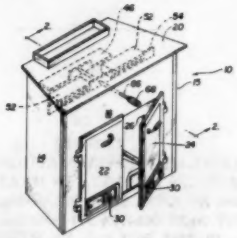
U.S. Cl. 126—289 **8 Claims**

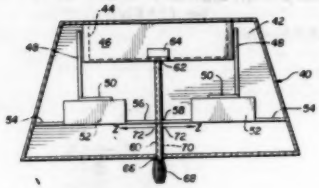
1. A solid fuel burning stove having a combustion chamber defined by a top wall, a bottom wall, a front wall, a rear wall and a pair of side walls, a flue in communication with said combustion chamber for removing exhaust gases and a catalytic converter apparatus within said combustion chamber; said catalytic converter apparatus comprising:

support means for supporting catalytic elements and having first and second inlet means, each in communication with the combustion chamber and flue;

a damper means slideably mounted on said support means for movement between open and closed positions with said first inlet means for opening and closing the same, and

elongated conduit means partially in said combustion chamber having one end coupled to the damper means and a second end remote from said one end extending outside the combustion chamber and having a handle means affixed thereon, said conduit means having an air inlet means outside the combustion chamber and an air outlet means inside thereof, and an intermediate flow channel connecting said air inlet mean to said air outlet mean for allowing the passage of outside air therethrough, said conduit means operative when activated by the user on said handle means for moving said damper means between the respective open and closed positions and for communicating outside air into the combustion chamber proximate the catalytic elements when the damper is in the closed position, whereby the catalytic elements receive outside air for enhanced combustion of the exhaust gases passing therethrough when said damper means is in the closed position.





4,694,821

AIR FEED CONTROL DEVICE FOR AN ENDOSCOPE

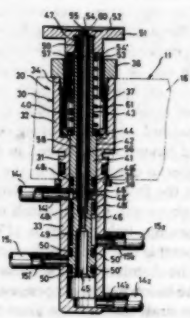
Mitsuo Kondo, Saitama, Japan, assignor to Fuji Photo Optical Co., Ltd., Saitama, Japan

Filed Oct. 23, 1985, Ser. No. 790,481

Claims priority, application Japan, Oct. 24, 1984, 59-159793[U]

Int. Cl.[4] A61B *1/12*

U.S. Cl. 128—4 **11 Claims**



1. In an air feed control device of an endoscope comprising regulating means mounted in an operating section of the endoscope, which means is provided with a vent hole opening to

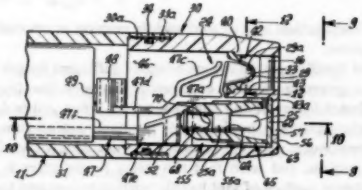
the atmosphere for regulating the quantity of air escaping therethrough into the atmosphere and by which means an intake air pipe having one end adapted to be connected to an air supply separate from the endoscope and an outlet air pipe having one end connected to an air feed nozzle at the distal end of an insertion section of the endoscope are connected in communication with each other; the improvement in which said regulating means includes therein an inflow air channel for connecting said vent hole with said intake air pipe and an outflow air channel for connecting said vent hole with said outlet air pipe, and inflow and outflow air channels being in communication with each other only in the vicinity of the point at which said vent hole opens to the atmosphere said regulating means comprising a hollow body having a cylindrical axial bore and a partition wall for dividing said cylindrical bore into two air channels for inflow and outflow.

4,694,822

SUBMERGIBLE LARYNGOSCOPE BATTERY HOUSING

Jack Bauman, 1677 San Onofre Dr., Pacific Palisades, Calif. 90272

Filed Apr. 1, 1986, Ser. No. 846,913
Int. Cl.[4] A61B *1/06*
U.S. Cl. 128—11 **28 Claims**



1. In a laryngoscope, having a blade and hollow body means including a handle and a cap, the combination comprising

(a) the handle adapted to receive dry cell means, the handle having an open end,

(b) the cap telescopically and removably interfitting the handle to close said open end, and means sealing off between the cap and handle,

(c) means carried by the cap to pass light from a light source within said body means to a predetermined zone at the cap exterior, whereby said light may be transmitted along the blade removably attached to the cap,

(d) a flexible barrier carried by the cap to be deflected by the blade upon its attachment to the cap, the barrier sealing off between the cap interior and exterior,

(e) and circuit means including a motion transmitting element to be deflected within the hollow body means in response to said barrier deflection to establish an ON condition of the circuit means for transmitting current from said dry cell means to said light source.

4,694,823

NECK AND FACIAL LIFT BAND ASSEMBLY

Marilyn M. Young, 430 57th Pl. NE., Minneapolis, Minn. 55432

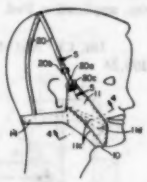
Filed Feb. 24, 1986, Ser. No. 832,382
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—76 B **8 Claims**

1. A neck and facial lift band comprising,

a chin and jaw engaging yoke assembly which includes: a central stretchable chin engaging segment with a pair of non-stretchable lateral jaw engaging segments extending upwardly from the central stretchable chin engaging segment and contoured to engage the lateral jaw and face portions,

a lower anchoring neck strap directly connected with an intermediate portion of each lateral jaw engaging segment to surround the rear portion of the upper neck of the wearer and securely anchor the assembly in a horizontal direction,

a pair of criss cross head engaging straps oriented to pass upwardly over the head of the wearer with the ends thereof respectively anchored to the rear portions of the



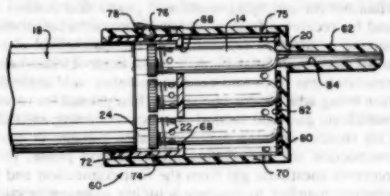
neck strap and the front ends respectively connected to the upper portions of the jaw engaging segments to provide an upwardly and rearwardly directed lifting action on the engaged jaw and face portions, one end of each of the head engaging straps being provided with a removable connection.

4,694,824

NASAL INHALATION SYSTEM

Max J. Ruderian, 545 Hanley Ave., Los Angeles, Calif. 90049

Division of Ser. No. 811,279, Dec. 20, 1985. This application Jun. 2, 1986, Ser. No. 869,363
Int. Cl.[4] A61M *15/00*
U.S. Cl. 128—203.22 **5 Claims**



1. A nasal inhalation system, comprising:

an air flow source;

a plurality of inhaler tubes each having at least one entry port and at least one exit port generally at opposite ends thereof;

a support nozzle including means for removably supporting each of said inhaler tubes at a position between said entry and exit ports of said inhaler tubes without obstructing said entry and exit ports; and

means for mounting said support nozzle onto said air flow source with said inhaler tubes supported by said nozzle in a position for flow-through passage of air from said air flow source into said entry ports and through said inhaler tubes for discharge via said exit ports;

said support means further including means for selectively opening and closing said inhaler tubes to flow-through passage of air from said air flow source, said means for selectively opening and closing comprising means for permitting air passage through a selected one of said inhaler tubes and for preventing air passage through the remaining ones of said inhaler tubes.

4,694,825

CONTROL FOR RESPIRATORS

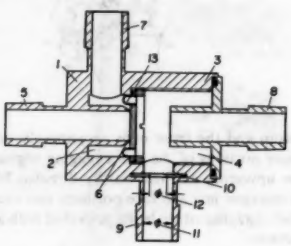
Janos Slemmer, Gross Grönau, and Gottfried Schröter, Lübeck, both of Fed. Rep. of Germany, assignors to Drägerwerk AG, Fed. Rep. of Germany

Filed Nov. 16, 1984, Ser. No. 672,275

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1983, 3341711

Int. Cl.[4] A61M 16/00

U.S. Cl. 128—205.24 3 Claims



1. A control for use by a patient with a respirator, comprising a valve housing (1) having an interior valve chamber (2), an exhaled gas inlet (5) extending into said interior valve chamber and terminating in an annular valve seat (6), said valve chamber extending around said valve seat, a diaphragm (13) means having one side engagable with and disengagable from said annular valve seat to open and close said exhaled gas inlet to said valve chamber, an exhaled gas outlet (7) connected to said valve chamber for receiving exhaled gas from said exhaled gas inlet when said diaphragm means is disengaged from said valve seat, said housing having a control chamber 4 bounded by an opposite side of said diaphragm means which is opposite from said valve seat, said diaphragm means separating said control chamber from said valve chamber, a first connection (8) to an anesthetic ventilator and bellows connected to said control chamber for supplying anesthetic gas to said control chamber and for receiving fresh mixed gas from said control chamber, a second connection (9) connected to said control chamber for supplying fresh mixed gas to said control chamber and for receiving gas from said control chamber, said second connection being adapted for connection to a patient for receiving the anesthetic gas, said second connection having an orifice plate (10) therein defining a reduced area passage in said second connection so that, during an inhalation phase, the patient receives anesthetic gas from the first connection and from the control chamber to produce a higher pressure in said control chamber than in said valve chamber to cause said diaphragm means to engage against said annular seat to close said exhaled gas inlet from said exhaled gas outlet, and during an exhalation phase, fresh mixed gas is supplied through said second connection and through said orifice plate into said control chamber and through said first connection to fill the bellows, said orifice plate causing pressure in said control chamber to be less than pressure in said valve chamber to disengage said diaphragm means from said annular valve seat to open said exhaled gas inlet with respect to said exhaled gas outlet.

4,694,826

ENDOTRACHEAL TUBE GUIDE

Martin H. Chester, Carmel, Calif., assignor to Carmel Medical Devices, Carmel, Calif.

Filed Nov. 13, 1984, Ser. No. 670,850

Int. Cl.[4] A61B 17/00

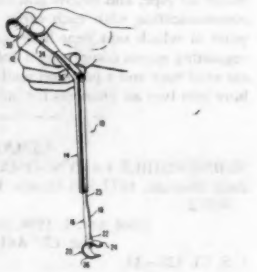
U.S. Cl. 128—303 R 7 Claims

1. An endotracheal tube guide for easily guiding an endotracheal tube in the posterior, anterior, lateral and medial directions during intubation, said guide comprising:

lower blade portion means having a generally semicircular configuration for engagement with an endotracheal tube during intubation and having an upper and a lower curved lip portion which defines said semicircular configuration;

an elongated middle portion connected to said blade portion means at an upper end of said blade portion means; and

handle portion means connected at a lower end thereof to an upper end of said middle portion and being oriented at an acute angle with respect to the longitudinal axis of said middle portion, said handle portion means and said semicircular blade portion means extending away from said



longitudinal axis of said middle portion in opposite directions;

said handle portion means being of sufficient length to form a gripping portion engageable between the thumb and index finger of one hand such that, when gripped, neither the hand nor the fingers of the hand extend substantially beyond a plane defined by a front face of said middle portion, and such that the index finger extends along a lower surface of said handle portion means and the thumb presses against a top surface of said handle portion means.

4,694,827

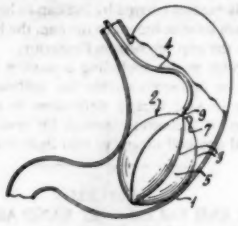
INFLATABLE GASTRIC DEVICE FOR TREATING OBESITY AND METHOD OF USING THE SAME

Brian C. Weiner, and Sarah H. Weiner, both of 24 Bowling Green Pl., Staten Island, N.Y. 10314

Filed Jan. 14, 1986, Ser. No. 818,736

Int. Cl.[4] A61B 17/00

U.S. Cl. 128—303 R 10 Claims



1. A flexible-walled, imperforate, air-inflatable balloon insertable and inflatable within the stomach of a human or animal to deter ingestion of food by occupying a substantial portion of the stomach volume, wherein the improvement comprises:

(a) said balloon having a plurality of wall portions that form smooth-surfaced convex outward protrusions when inflated,

(b) said protrusions being distributed around the balloon and cooperatively defining a plurality of outwardly open channels for passage of fluent material between the balloon outer surface and the stomach wall, and

(c) said protrusions being shaped and disposed to permit

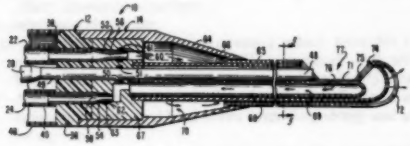
engagement of the stomach wall by the balloon only at spaced localities so as to maintain a substantial portion of the stomach wall away from contact with the balloon, for minimizing complications due to mechanical trauma of the balloon against the stomach wall.

4,694,828

LASER SYSTEM FOR INTRAOCULAR TISSUE REMOVAL

Daniel M. Eichenbaum, 5258 Linton Blvd., Suite 302, Delray Beach, Fla. 33445

Filed Apr. 21, 1986, Ser. No. 854,134
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.1 20 Claims



1. A needle probe for removing tissue comprising:

an outer housing having first and second ends and inner and outer surfaces, said outer housing having means defining a first aperture on a first side of said housing adjacent said second end, and means defining a second aperture substantially at said second end;

an inner housing located inside said outer housing, said inner housing having first and second ends, first and second opposite sides, and inner and outer surfaces, said inner housing having means defining an inner housing aperture positioned substantially coaxially with said means defining said first aperture in said outer housing, and on said first side of said inner housing, which side is laterally adjacent to said first side of said outer housing;

the volume bounded by said means defining said coaxial first and inner housing apertures in said outer and inner housings defining a photovaporization zone;

said inner surface of said outer housing and said outer surface of said inner housing defining an irrigation passageway for irrigating liquid, which liquid flows through said passageway from said first ends of said outer and inner housings and exits the probe through said second aperture in said outer housing, said irrigation passageway being connectable to an irrigation generator;

a laser tube positioned inside said inner housing and laterally adjacent to said first side of said inner housing, said laser tube having first and second ends, said first end being connectable to a laser generator and said second end being located adjacent said photovaporization zone to deliver laser energy into said zone; and

an aspiration tube having first and second ends, and first and second opposite sides, said aspiration tube being positioned inside said inner housing with said second side of said aspiration tube being laterally adjacent to said second side of said inner housing, said aspiration tube having means defining an aspiration aperture on said first side of said aspiration tube adjacent said second end, said means defining said aspiration aperture being positioned substantially coaxially with said means defining said first aperture of said outer housing and said means defining said inner housing aperture of said inner housing, said first end of said aspiration tube being connectable to an aspiration generator.

4,694,829

THERAPEUTIC STUFFED TOY

Ruth E. Frye, 505 S. Main, Lindsay, Okla. 73052

Filed Jan. 9, 1986, Ser. No. 817,901
Int. Cl.[4] A61F *7/08, 7/10*
U.S. Cl. 128—399 13 Claims

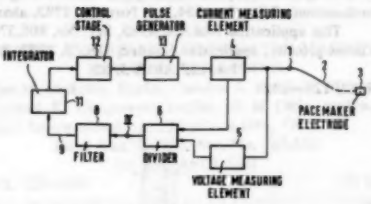
12. A therapeutic toy positionable in heat exchange relation to the human body comprising: an outer body member having an outer configuration of an animal-like figure and having an inner cavity; a container in said inner cavity; non-toxic particulate material dampened with liquid having a freezing point below that for water and a boiling point above that for water in said container, said material and said container being substantially inert with respect to each other, and said container being substantially impervious to said material, said container being hermetically sealed to allow heating or cooling of material in said container to form a heat sink; and insulation material around said container to control the rate of heat transfer to and from said material.

4,694,830

HEART PACEMAKER WITH RESPIRATORY SIGNAL GENERATION CAPABILITY

Anders Lekholm, Bromma, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich

Filed Sep. 24, 1986, Ser. No. 911,057
Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535534
Int. Cl.[4] A61N *1/00;* H05G *0/00*
U.S. Cl. 128—419 PG 3 Claims



1. In a heart pacemaker for supplying stimulation pulses to a heart via a pacemaker electrode, the improvement comprising:

means connected to said pacemaker electrode for measuring the stimulation current;

means connected to said pacemaker electrode for measuring the stimulation voltage;

a divider connected to said means for measuring the stimulation current and means for measuring the stimulation voltage for forming an impedance signal corresponding to the electrode impedance;

means for generating a signal corresponding to the respiration rate of said pacemaker user from said impedance signal and for controlling the pulse rate of said pacemaker dependent thereon.

4,694,831

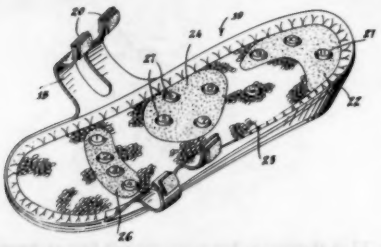
MASSAGE FOOTWEAR

Charles J. Seltzer, 17 Autumn Dr., Danbury, Conn. 06810

Continuation of Ser. No. 568,039, Jan. 4, 1984, abandoned. This application Jul. 25, 1986, Ser. No. 887,982

Int. Cl.[4] A61F *5/14*

U.S. Cl. 128—582 **5 Claims**



1. A footwear article having an outer sole provided with an inner surface normally facing the underside of a human foot and an upper closure means for said footwear article and attached to opposite marginal edges thereof, at least three raised flat foot support platforms on said inner surface, said inner surface other than the portion supporting said platforms being provided with a plurality of non-specific rounded projections located on substantially all the areas of said inner surface not occupied by said platforms, said platforms having a plurality of spaced, foot stimulating, dome-shaped massage bumps, each of said bumps having a greater diameter than height, and said platforms having a flat, lightly stippled surface on each of said platforms in the areas not occupied by said massage bumps for preventing slippage of the foot when said footwear article is worn, said platforms with massage bumps thereon supporting the ball, mid-sole, arch and heel of the wearer's foot, the locations of said massage bumps being selected to engage the underside of the wearer's foot either directly or indirectly to cause continuous stimulations of the sole of the foot thereby providing an improvement in circulation and in the overall health of the wearer.

4,694,832

DIALYSIS PROBE

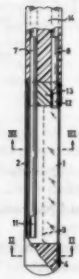
Carl U. Ungerstedt, Mjölnarstigen 11, S-18146 Lidingö, Sweden

Continuation of Ser. No. 554,116, Nov. 21, 1983, abandoned. This application Nov. 22, 1985, Ser. No. 800,374

Claims priority, application Sweden, Dec. 1, 1982, 8206863

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—632 **1 Claim**



1. A dialysis probe for insertion into biological tissues, comprising a hollow fibre dialysis membrane of uniform cross-sectional configuration throughout its length, an elongated mounting that surrounds and supports and includes means for partially exposing the outer surface of the membrane so that the outer exposed surface of the membrane is free to contact biological tissue in which the probe is inserted, the mounting having an exposed outer surface and being substantially more rigid than the membrane and having an internal diameter greater than the greatest external diameter of the membrane, and ducts for supplying and removing perfusion liquid to and from the interior of the membrane, one of said ducts extending to the distal end of the hollow fibre membrane and being open to the distal end of the membrane, said one duct being disposed inside the hollow fibre membrane and having an external diameter substantially less than the internal diameter of the hollow fibre membrane, the other duct communicating with the proximal end of the hollow fibre membrane, substantially all the inner surface of the membrane opposite said outer exposed surface of the membrane being exposed to the flow of liquid between said ducts.

4,694,833

NONINVASIVE DEVICE FOR PHOTOELECTRICALLY MEASURING THE PROPERTY OF ARTERIAL BLOOD

Kenji Hamaguri, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

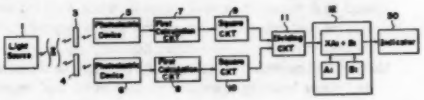
Division of Ser. No. 467,431, Feb. 17, 1983, Pat. No. 4,586,513. This application Mar. 13, 1986, Ser. No. 839,433

Claims priority, application Japan, Feb. 19, 1982, 57-26639

The portion of this patent subsequent to May 6, 2003, has been disclaimed.

Int. Cl.[4] A61B *5/00, 6/00*

U.S. Cl. 128—633 **20 Claims**



1. A noninvasive device for photoelectrically measuring a property of arterial blood in living tissue comprising:

means for generating a source light and causing said light to enter into living tissue, such that the light generating means remains outside the living tissue and only the generated light passes into the living tissue;

means for photoelectrically measuring the intensity of the source light emerging from the living tissue after contact with the arterial blood therein, at a pair of separate wavelengths, to produce a pair of electrical signals, respectively, each signal including an alternating-current component and a direct-current component;

means for calculating information from said pair of electric signals representative of the relative amplitude of the alternating-current component compared to the direct-current component for each of the measured wavelengths and for producing first and second calculated outputs, respectively, each output representing a respective said relative amplitude;

means for obtaining a final output signal according to a function containing the square of a ratio between the first and second calculated outputs and containing no terms of first order in said ratio; and

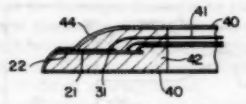
means for indicating the property of the arterial blood in response to the final output.

4,694,834

GAS SENSOR

Mark E. Meyerhoff, Ann Arbor, Mich.; Eric J. Fogt, Maple Grove, and Darrel F. Untereker, Cedar, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Mar. 31, 1986, Ser. No. 846,388
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—635 **11 Claims**



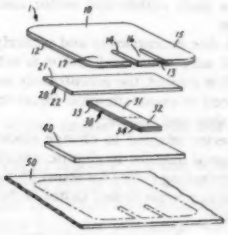
1. A gas sensor comprising:
a pH-sensitive FET transducer having a gate-insulated field-effect transistor structure;
a reference electrode;
an insulating tube having an opening which provides connecting lead wires to the FET transducer and which houses said transducer, said gate region of said FET transducer being located in the opening provided in said insulating tube, and said lead wires extending along said insulating tube;
electrical insulation resin placed between the inner wall of said tube and lead-wire-FET connecting points to stop said opening of the tube; and
a gas permeable membrane overlying and in direct contact with the gate region of the FET transducer whereby the existence of any discernible layer between the gas permeable membrane and the FET transducer is precluded.

4,694,835

BIOMEDICAL ELECTRODE

Jerome E. Strand, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 21, 1986, Ser. No. 865,521
Int. Cl.[4] A61B *5/04*
U.S. Cl. 128—640 **6 Claims**



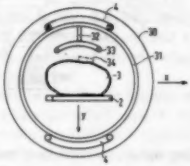
1. A biomedical electrode comprising
(a) a backing;
(b) a biocompatible pressure-sensitive adhesive coating one surface of the backing;
(c) a bonding sheet having first and second faces and being smaller in surface area than the backing wherein the first face is adhered to the biocompatible pressure-sensitive adhesive;
(d) an electrical conductor having top face divided into first and second surfaces and a bottom face divided into third and fourth surfaces wherein the first surface is opposed to the third surface, the second surface is opposed to the fourth surface, the first surface spans a portion of the second face of the bonding sheet and the second surface adheres to a portion of the biocompatible pressure-sensitive adhesive, and
(e) an electrolyte composition, having a surface area smaller than that of the backing sheet which electrolyte composition is:
(i) in electrical contact with the third surface of electrical conductor, and
(ii) adhered to at least a portion of the second face of the bonding sheet which is not spanned by the electrical conductor.

4,694,836

MRI TOMOGRAPHY APPARATUS FOR GENERATING A MOTION SIGNAL

Dirk Bulkman; Thomas Helzel, and Peter Röschman, all of Hamburg, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1985, Ser. No. 809,635
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446717; Mar. 21, 1985, 3510195
Int. Cl.[4] A61B *5/05*
U.S. Cl. 128—653 **14 Claims**



1. A MRI tomography apparatus for generating a motion signal comprising
first high frequency coil means, surrounding a body to be examined, for generating a high frequency magnetic field at the Larmor frequency, said first high frequency coil means receiving spin resonance signals from said body to be examined,
second high frequency coil means, positioned adjacent to said body and within said first high frequency coil means, for generating a motion signal, and
impedance measuring means for measuring impedance of said second high frequency coil means to determine said motion signal.

4,694,837

CARDIAC AND RESPIRATORY GATED MAGNETIC RESONANCE IMAGING

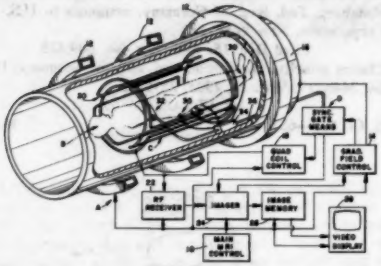
Douglas M. Blakeley, Euclid; Carolyn A. Kershaw, Mentor, and Raymond E. Gangarosa, Euclid, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Aug. 9, 1985, Ser. No. 764,440
Int. Cl.[4] A61B *5/05*
U.S. Cl. 128—653 **20 Claims**

1. An anatomical condition gating apparatus for a magnetic resonance imager, the apparatus comprising:
a first anatomical condition detector means for monitoring at a first anatomical site within an imaging magnetic field of the imager a first anatomical condition of a patient to be imaged;
a second anatomical condition detector means for monitoring at a second anatomical site within the imaging magnetic field a second anatomical condition of the patient to be imaged;
a light source means for transmitting a light signal from within the imaging magnetic field to a light signal receiver disposed out of the imaging magnetic field;
an encoding means for encoding the light signal within the imaging magnetic field in accordance with both the first and second anatomical conditions monitored by the first

and second anatomical condition detector means, the encoding means being operatively connected with the first and second anatomical condition detector means and the light source means, whereby information about the first and second monitored anatomical conditions is transmitted through the imaging magnetic field without altering the imaging magnetic field;

a light signal decoding means operatively connected with the light signal receiver for recovering first and second anatomical condition encodings from the encoded light signal;



a scan triggering means for initiating imaging scans in accordance with the first anatomical condition encoding of the received light signal, the scan triggering means being operatively connected with the light signal decoding means; and,

a scan blocking means for preventing processing of imaging data in accordance with the second anatomical condition encoding of the received light signal, the scan blocking means being operatively connected with the light signal decoding means.

4,694,838

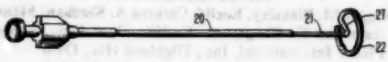
LOOP CORONARY CATHETER

Bandula Wijayarthna, Friendswood, Tex., and Glenn E. Newman, Durham, N.C., assignors to Mallinckrodt, Inc., St. Louis, Mo. and Duke University, Durham, N.C.

Continuation-in-part of Ser. No. 575,276, Jan. 30, 1984, abandoned. This application Jan. 23, 1985, Ser. No. 693,974

Int. Cl.[4] A61M *25/00*

U.S. Cl. 128—658 **25 Claims**



1. A catheter for coronary angiography comprising

a tubular flexible body portion,

a tubular flexible tip portion on one end of the body portion communicating therewith,

said tip portion having a loop formed therein with the plane of the loop being transverse to the asxis of the body poriton,

said loop having at least one arcuate portion with outwardly directed peripheral opening means formed therein,

said periperhal opening meansextending longitudinally in the peripheral wall of the one arcuate portion for a distance at leat two times the width of the opening means for directing a fan-like flow of contrast medium toward a selected sector of an aorta wall, and

said loop having adjacent arcuate portions devoid of peripheral openings on both sides of the one arcuate portion and extending for angular distances each greater than the angular distance of the one arcuate portion.

4,694,839

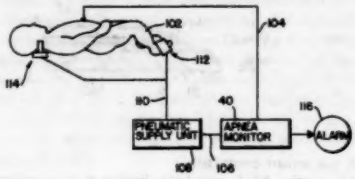
AUXILIARY STIMULATION APPARATUS FOR APNEA DISTRESS

William F. Timme, 891 Amaryllis Ave., Oradell, N.J. 07649

Filed Mar. 24, 1986, Ser. No. 842,831

Int. Cl.[4] A61B *5/08*

U.S. Cl. 128—721 **19 Claims**



1. An apnea monitor-assist apparatus which provides physical stimulation of a patient in response to the monitor's reaction to a reduced respiratory action by the patient, said respiratory action of sufficient magnitude to actuate said monitor-assist and, in response to an electronic signal or signals from said monitor-assist, the assist apparatus is also actuated, said assist apparatus including:

(a) means for receiving a signal from an actuated monitor and electronically converting said received signal into an electrical flow of current to an electrical motor;

(b) a shoe removably attachable to a foot of a patient, said shoe characterized as having:

(b1) a selectable tightening means;

(b2) a sole member;

(b3) an upper portion attached to said sole member and, with said upper portion attached to the sole member, said selectable tightening means may be manipulated to cause the shoe to be attached to the foot of the patient, and

(b4) an enclosure removably attached to the sole member of the shoe;

(bb1) an electric motor arrayed within this enclosure and fixedly secured in spaced array from said sole;

(bb2) a shaft within said motor and extending therefrom;

(bb3) a disc eccentrically and securely mounted on said shaft and, when said motor is actuated so that the shaft is rotated, the eccentrically mounted disc is also rotated to cause vibration forces to be transmitted to the shoe and patient;

(c) a converter adapted to change electronic signals from said actuated monitor to electric current, and

(d) wire conducting means for transmitting electrical current from said converter to said motor in the enclosure portion of the shoe.

4,694,840

ELECTRO-THERAPEUTIC DEVICE

Alexandre Kairis, and Ronnie H. Colsen, both of Tokyo, Japan, assignors to 501 Waco Trading Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 601,167, Apr. 17, 1984, abandoned. This application Feb. 4, 1986, Ser. No. 825,919

Claims priority, application Japan, Oct. 25, 1983, 58-164090[U]; Nov. 16, 1983, 58-176085[U]

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—735 **10 Claims**

1. A probing and stimulating device for use with a sensitive point on the skin comprising:

a housing comprising a long and flat tube of insulating material;

a pair of electrodes disposed coaxially at one end of said housing, one of said electrodes forming a first center electrode having an axle shape surrounded by an insulat-

ing zone made from insulating materials, said insulating zone being thicker in the direction of radius than the diameter of a skin sensitive point, and the other of said electrodes forming a second annular electrode immediately surrounding the insulating zone in a coaxial arrangement with respect to said first center electrode;

electronic circuit means for locating and stimulating the sensitive point, said electronic circuit means including a locating circuit for locating a skin sensitive point, a stimulator circuit for stimulating the skin sensitive point, and a selector switch having a first position for selecting operation of the locating circuit and a second position for selecting operation of the stimulating circuit,

said locating circuit having a first lead for connecting the locating circuit to the selector switch, a second lead for connecting the locating switch to the first center electrode, and a third lead for connecting the locating circuit to the second annular electrode and to an electrical ground,

said stimulating circuit having a first lead for connecting the stimulating circuit to the selector switch, a second lead for connecting the stimulating circuit to the first center electrode and a third lead for connecting the stimulating circuit to the second annular electrode and to an electrical ground,

said locating circuit comprising a first lamp for indicating when the locating circuit is selected, whether the pair of electrodes are in contact with electrically low resistant skin, a second lamp for indicating, when the locating circuit is selected, alignment of the pair of electrodes with a skin sensitive point, a converter circuit connected to said second and third leads of the locating circuit and connected to said first lead through said first lamp and connected again to said first lead through said second lamp, said converter circuit comprising a first comparator for driving the first lamp when the electrodes are in contact with electrically low resistant skin, a second comparator driving the second lamp when the resistance across the electrodes drops, thereby indicating alignment with a skin sensitive point, said stimulating circuit comprising an electrically high potential pulse generator for developing a high potential peaked pulse, and a discriminating circuit for cutting off the lower level of said peaked pulse below a predetermined value, thus generating a pulse with a peaked crown of high potential for supplying to said electrodes.

4,694,841

SYSTEM FOR THE SELF-LIGHTING OF CIGARETTES

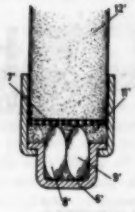
Natividad G. Esparza, C/ Bolivia 15, 28016-Madrid, Spain

Filed Jun. 21, 1985, Ser. No. 747,563

Claims priority, application Spain, Jul. 17, 1984, 534,390; Jan. 11, 1985, 539,495

Int. Cl.[4] A24D *1/08*

U.S. Cl. 131—351 **28 Claims**



1. A cigarette lighting cap, comprising:

a housing having an upper section and a lower section divided by a grid, said upper section adapted to receive the front end of a cigarette;

a container located in said lower section of said housing and containing a substance which reacts, upon direct contact with air, to produce a sufficient amount of heat to ignite said front end of said cigarette when a cigarette is located in said upper section of said housing; and

means for breaking said container in response to a predetermined actuation by the user of said cap.

4,694,842

TEA-CONTAINING TOBACCO

Kouzou Kobayashi, 239-3 Miyanogicho, Chiga-shi, Japan (281)

Filed Sep. 21, 1983, Ser. No. 534,151

Int. Cl.[4] A24B *15/18;* A24D *1/18*

U.S. Cl. 131—359 **1 Claim**

1. A tobacco composition consisting of tobacco leaves, green tea leaves, dry chrysanthemum flower and Cnidii Rhizoma.

4,694,843

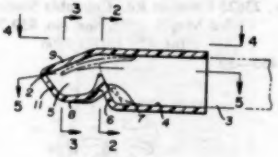
FINGERTIP COVER

Elaine J. Casenhiser, 379 Lindenwood Ave., Akron, Ohio 44301

Filed Oct. 7, 1986, Ser. No. 916,116

Int. Cl.[4] A45D *29/00;* D05B *91/04*

U.S. Cl. 132—73 **8 Claims**



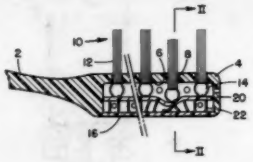
1. A finger-end cover comprising an elongate, flexible sheath having a closed front end and an open rear end, with a continuous tubular cavity extending therebetween, a stop barrier dividing said cavity into a front protector portion and a rear finger-gripping portion, said protector portion including stiffening means to resist collapse of the walls of said sheath, said gripping portion adapted to receive and retain a finger-end inserted therein no further than to said barrier, at which finger end location the said protector portion is adapted to surround and protect a nail on the finger end.

4,694,844

TOOTHBRUSH

Marta N. Berl, 15 Usha Street, Kiryat Bialik, and Esther Turner, 4 Harakafot Street, Haifa, both of Israel

Filed Feb. 22, 1985, Ser. No. 704,632
Claims priority, application Israel, Feb. 27, 1984, 71065
Int. Cl.[4] A46B *3/00*
U.S. Cl. 132—84 R **9 Claims**



1. A toothbrush comprising:

a handle;

a hollow head contiguous with said handle and having a bottom provided with a plurality of holes passing through said bottom;

a plurality of tufts, each tuft consisting of a bundle of bristles fixedly joined together at one end portion thereof, said end portions forming joints, at least some of said tufts being slidingly mounted in said holes, with said joints located inside the hollow of said head, and the major portion of each of said tufts projecting from said head;

a cover plate for said head, to cover the hollow thereof, and

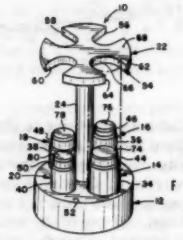
at least one element, elastically deformable in bending, being located inside said hollow head, said elastically deformable element being made of an elastomer and comprising a relatively thin plate, movably disposed in said hollow, one side of which plate is in contact with said tuft joints, and from the other side of which plate protrudes a plurality of flexible members abutting against the inner surface of said cover plate, which elastically deformable element, in the state of rest of said toothbrush, urges at least one of said tufts towards a limit position, wherein pressure applied to at least one tuft during use of said toothbrush will cause the collective tips of said tufts to conform to the contours of a given group of teeth as a result of at least one of said tufts being pushed into said head to varying degrees against the restoring force of said elastically deformable element, and wherein said holes directly support said tufts slidingly mounted therein.

4,694,845

COIN COUNTER AND WRAPPER AND METHOD OF COUNTING AND WRAPPING COINS

John Zay, 23623 Emmons Rd., Columbia Station, Ohio 44028

Filed May 5, 1986, Ser. No. 859,703
Int. Cl.[4] G07D *9/06*
U.S. Cl. 453—59 **12 Claims**



1. A coin counter and wrapper holder for use with a coin wrapper intended to contain a stack consisting of a predetermined number of coins, said coin counter and wrapper holder comprising

a base,

first wrapper support means connected with said base for positioning a first end portion of a coin wrapper,

end stop means connected with one of said base and first wrapper support means for abutting a first end of the coin wrapper to limit axial movement of the coin wrapper in one direction,

second wrapper support means connected with said base for positioning a second end portion of the coin wrapper, said second wrapper support means having a surface flush with a second end of the coin wrapper opposite the first end thereof and surface means defining a side opening in said second wrapper support means proportioned for receiving and embracing the coin wrapper, said second wrapper support means including a post connected with said base and a bracket including a plate which includes said surface, said bracket being mounted to said post, and

coin stack positioning means for supporting a stack of coins consisting of the predetermining number of coins with one end of the stack flush with said surface of said second support means

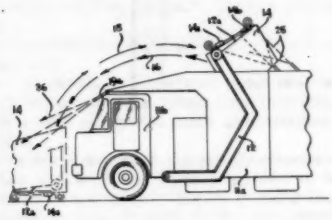
wherein said first wrapper support means comprises an upstanding member proportioned to fit inside the coin wrapper and said coin stack positioning means comprises an end face of said upstanding member.

4,694,846

GARBAGE TRUCK WITH TRASH BIN CLEANING SYSTEM

Roland D. Bouchard, 15419 Doty Ave., Lawndale, Calif. 90260

Filed Sep. 9, 1986, Ser. No. 905,197
Int. Cl.[4] B08B *3/02, 9/08;* **A61L** *11/00*
U.S. Cl. 134—78 **6 Claims**



1. In a garbage truck for removing garbage contained in a trash bin, said truck including a compartment for receiving garbage from said bin, a cab for the operator of the truck and conveyor arm means for lifting the bin from a first upright position on the ground to a second inverted position above said compartment whereat the garbage is emptied into the compartment and then returned back to its initial upright position on the ground, the improvement being means for washing and deodorizing said trash bin comprising:

a first set of spray nozzles mounted on said truck behind the compartment,

means for feeding a washing liquid to said first set of nozzles when the bin is on its inverted position and after the bin has been emptied,

said first set of nozzles being positioned to direct sprays of said washing liquid against the interior and exterior walls of said bin,

a second set of spray nozzles mounted on the cab of the truck, and

means for feeding deodorizing liquid to said second set of nozzles after the bin has been sprayed from first set of nozzles and has been returned to its upright position on the ground,

said second set of nozzles being positioned to direct sprays of said deodorizing liquid against the interior and exterior walls of said bin.

4,694,847

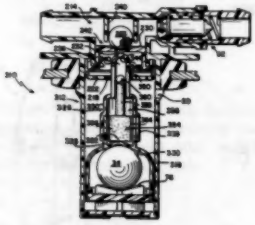
ROLL-OVER VALVE WITH SEALING BALL

Emil Szlaga, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Continuation-in-part of Ser. No. 911,243, Sep. 24, 1986, which is a continuation-in-part of Ser. No. 837,152, Mar. 7, 1986, Pat. No. 4,655,238. This application Oct. 9, 1986, Ser. No. 916,879

Int. Cl.[4] F16K *17/36*

U.S. Cl. 137—39 **20 Claims**



1. A roll-over valve for use in a vehicle fuel system having an outlet for discharging fuel vapor, the roll-over valve comprising

a hollow valve member terminating in a distal tip formed to include a top aperture and having a side wall formed to include at least one side aperture,

roll-over means for moving the distal tip from an outlet-opening position to an outlet-closing position in response to tilting the hollow valve member during vehicle roll-over conditions, and

closing means in the hollow valve member for closing the top aperture in response to predetermined tilting movements of the hollow valve member so that passage of fuel through the outlet is blocked.

4,694,848

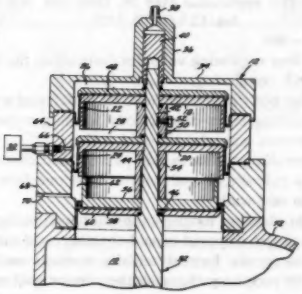
FLOW CONTROL VALVE

Walter E. Jorgensen, 815 Columbia St., So., Pasadena, Calif. 91030, and Robert L. Linquist, 11851 Melody Park Dr., Garden Grove, Calif. 92640

Filed Oct. 24, 1985, Ser. No. 790,956

Int. Cl.[4] F16K *31/126*

U.S. Cl. 137—114 **4 Claims**



1. A direct acting flow control valve comprising:

a valve body;

valve means movable in said valve body for throttling a flow of fluid through said valve body;

bias means operative upon said valve means for biasing said valve means in a first direction;

first actuator means coupled to said valve means and including first rolling diaphragm means fixed to said valve body for defining an actuator chamber, and for operating said valve means in a direction opposite said first direction in response to an operating fluid pressure developed in said actuator chamber;

means for admitting fluid to said actuator chamber for developing said operating fluid pressure;

second actuator means coupled to said valve means and including second rolling diaphragm means fixed to said valve body in spaced relation to said first rolling diaphragm means for defining a leakage chamber for retaining any fluid leaking past said first rolling diaphragm means as a consequence of a failure of said first rolling diaphragm means, said second rolling diaphragm means having the same dimensions and configuration as said first rolling diaphragm means whereby, upon any failure of said first rolling diaphragm means, said second rolling diaphragm means is adapted for operating said valve means in a manner identical to that of said first rolling diaphragm means;

response means for sensing the development of said operating fluid pressure in said leakage chamber upon leakage of fluid past said first rolling diaphragm means and into said leakage chamber;

third actuator means coupled to said valve means in spaced relation to said second actuator means for movement in said first direction in response to a pressure head developed in said valve body by said flow of fluid through said valve body, and for isolating said second actuator means from said flow of fluid; and

vent means for venting to atmosphere the space between said second actuator means and said third actuator means.

4,694,849

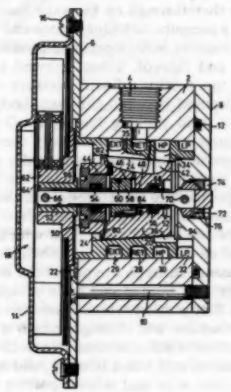
HYDRAULIC CONTROL VALVES

William H. S. Rampen, R.R. No. 1, Oakville, Ontario, Canada L6J 4Z2

Continuation-in-part of Ser. No. 633,504, Jul. 23, 1984, abandoned. This application May 5, 1986, Ser. No. 859,787

Int. Cl.[4] F16K *11/083*; F15B *9/08*

U.S. Cl. 137—312 **16 Claims**



1. In a balanced hydraulic valve structure of the type comprising a stationary member and a rotatable plug received in a bore defined in the stationary member, wherein valving is achieved by establishing selective communication between

valve ports opening into the bore defined by the stationary member through cavities formed in the plug, the ports and cavities being arranged so that there is substantial cancellation of radially acting hydrostatic forces acting on the plug, and the plug and the bore being provided with complementary tapers; the improvement wherein a variable leakage path is defined between the plug and the bore of a magnitude determined by their relative axial position; linear actuator means is provided to sustain unbalanced axial hydrostatic forces acting on the tapered plug; and means are provided to sense movement of the plug and to establish a negative feedback loop to said linear actuator means whereby to cause the latter to oppose movements of the plug tending to alter the leakage path from a nominal value corresponding to an equilibrium position of the plug relative to the bore.

4,694,850

GAS SUPPLY MECHANISM

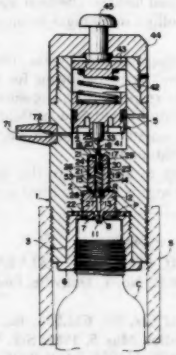
Ichiro Fumino, Tokyo, Japan, assignor to Nippon Tansan Gas Co., Ltd., Tokyo, Japan

Filed Oct. 7, 1986, Ser. No. 916,233

Claims priority, application Japan, Oct. 11, 1985, 60-154352 [U]; Nov. 19, 1985, 60-176841[U]; Mar. 27, 1986, 61-67193

Int. Cl.[4] F16K *51/00*; B67B *7/24*

U.S. Cl. 137—318 **5 Claims**



1. A gas supply mechanism comprising a main body which has a hole therethrough on the axial line thereof containing a socket for a pressure cartridge on one end thereof and a second pressure chamber with a pressure modulating mechanism on the other end thereof, a nut screwed into said socket and around a top portion of said pressure cartridge to settle a packing disposed between the main body and said cartridge top portion, said packing having an O-ring part and a flat ringlike flange part on the periphery thereof, a piercing body having a needle projecting downwardly and into engagement with said packing at said cartridge top portion, said needle having a gas passage therethrough on the axial line thereof, a valve housing having a gas passage therethrough on the axial line thereof and having a cavity in which a sealing member is settled and an outer periphery on which communicates with said gas passage through a bypass at one end of and around said gas passage; said hole in said body comprising midway therethrough a first portion which communicates with the second pressure chamber and through which a valve pin moves, a second portion which communicates with said first portion and which receives said valve housing, and a third portion which communicates with said second portion and into which said piercing body screws; said valve pin co-operating with said sealing member to make and cut off connections between said gas passage and said second pressure chamber, said packing being settled in said main body by said nut with its flange part on said piercing body and with its O-ring part being deformed around said needle and into engagement with said cartridge top portion when said needle pierces said cartridge top portion, to thereby provide an effective seal between said needle and said cartridge top portion.

4,694,851

FLOW REGULATOR AND ITS USE

Erkki Aalto, and Veikko Ylä-Hemmilä, both of Kausala, Finland, assignors to Halton Oy, Finland

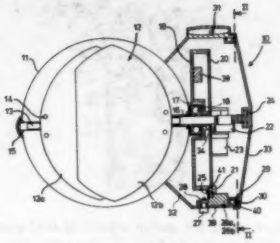
PCT No. PCT/FI84/00038, § 371 Date Jan. 7, 1985, § 102(e) Date Jan. 7, 1985, PCT Pub. No. WO84/04804, PCT Pub. Date Dec. 6, 1984

PCT Filed May 17, 1984, Ser. No. 694,393

Claims priority, application Finland, May 20, 1983, 831802

Int. Cl.[4] F16K *17/34*; F24F *11/04*

U.S. Cl. 137—499 **13 Claims**



1. A flow regulator intended for gaseous substances, in particular for air in air-conditioning and ventilation installations for maintaining the volumetric flow of a gaseous substance at desired magnitude with sufficient accuracy at differential pressure across the flow regulator varying within given limits, said flow regulator comprising an envelope and a regulating member disposed in a flow passage confined by the envelope, characterized in that the flow regulator is provided with limiting members constituting means for restricting the differential pressure range of the flow regulator, said limiting members being disposed to limit the movement of the regulating member, wherein minimum and maximum breadth of the differential pressure are arbitrarily determined by said limiting members.

4,694,852

FLOW REGULATING VALVE FOR CONTROLLING THE FLOW OF CORROSIVE FLUIDS

Robert W. Grant, Pleasanton, Calif., assignor to FSI Corporation, Chaska, Minn.

Continuation-in-part of Ser. No. 693,127, Jan. 22, 1985, abandoned. This application May 30, 1986, Ser. No. 868,568

Int. Cl.[4] G05D *7/01*

U.S. Cl. 137—501 **7 Claims**

1. A fluid flow regulating valve for controlling the flow of a corrosive fluid, comprising:

a solid valve body having an inlet, an outlet, and a plurality of intersecting bores in said body forming a passage for flow between said inlet and said outlet;

a flow controlling orifice in said passage said element comprising a cylindrical wall with at least one fluid control orifice in said wall;

a fluid-tight chamber having an interior wall surface;

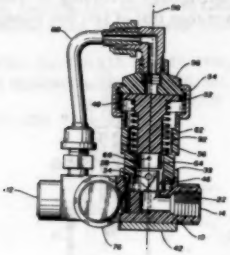
a movable piston disposed in said chamber, said piston having an integrally formed radially resilient sealing ring around its periphery engaging the interior wall surface of said chamber;

means for generating a first and second fluid pressure whose difference is proportional to said fluid flow;

means for coupling said first pressure to said chamber on one said piston;

means for coupling said second pressure to said chamber on the other side of said piston;

a valve stem connected to said piston; and



a cylindrical recess in said stem forming a control surface in sliding engagment with said cylindrical wall whereby movement of said piston causes said control surface to move across said fluid control orifice.

4,694,853

WAFER CHECK VALVES

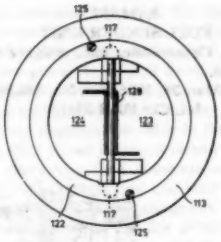
Richard S. Goodwin, Stoke-On-Trent, England, assignor to R. Goodwin International Ltd., Hanley-Stoke-On-Trent, England

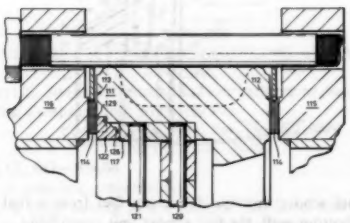
Filed May 2, 1985, Ser. No. 729,741

Claims priority, application United Kingdom, May 2, 1984, 8411255; Feb. 6, 1985, 8503035

Int. Cl.[4] F16K *15/03*

U.S. Cl. 137—512.1 **2 Claims**





1. A wafer check valve comprising an annular housing having two end faces, a passage through said housing, said passage comprising, at one section of the housing, two generally semicircular opening, sealing surfaces formed on the housing within said passage around said openings, two closing flaps effective to close respective ones of said openings, spring means to urge said flaps to a passage closing position in contact with said sealing surfaces, diametrically opposed axially extending slots formed in asaaid housing and opening into said passage towards one end face of said housing, an insert received in each of said slots, a radial bore in each insert, said bores opening in said passage, a hinge pin on which said flaps are both pivotally mounted, end portions of said hinge pin being received in each of said bores to mount said hinge pin diametrically in said housing, said hinge pin end portions and said bores being dimensioned to allow limited axial play between said hinge pin and said inserts to facilitate opening and closing of said flaps without any wear on the housing or sealing surfaces, retaining means fixedly securing said inserts in said slots and effective to preclude any axial movement between said inserts and said housing, said retaining means comprising an annular groove formed in said housing, said groove opening into said passage and into said one end face and said slots opening into said annular groove, a retaining ring located in said annular groove and abutting said inserts, means securing said retaining ring against movement to thereby prevent said inserts from moving in said housing, the ring having a smaller outer radius than said one end face whereby the junction between said ring and said one end face is radially inwards of the outer edge of said one end face, whereby upon location of the valve in a pipe system with a flange abutting said one end face a gasket can be located to cover said junction without being subject to localised increased degradation forces.

4,694,854

DEVICE FOR REGULATING THE DISCHARGE OF FLUID FROM A CONTAINER

Klaus U. Giehl, Heimborn, Fed. Rep. of Germany, assignor to Lothar Steinhardt, Fed. Rep. of Germany

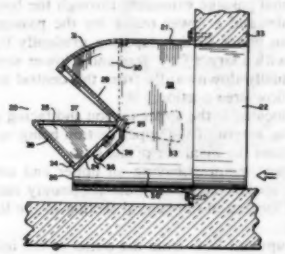
PCT No. PCT/DE84/00221, § 371 Date Jun. 6, 1985, § 102(e) Date Jun. 6, 1985, PCT Pub. No. WO85/01974, PCT Pub. Date May 9, 1985

PCT Filed Oct. 25, 1984, Ser. No. 744,068

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1983, 3338793; Sep. 27, 1984, 3435450

Int. Cl.[4] F16K *17/12*

U.S. Cl. 137—519 **15 Claims**



1. A regulating device for controlling the flow of a fluid from a container through an outlet opening provided in the container, the regulating device comprising

a throttling unit which is seated to pivot on an axis and can close in a manner that regulates the cross-sectional area of closure of the outlet opening,

counterweight means situated outside of the container for normally retaining the throttling unit in an inactive position away from the outlet opening to maximize the cross-sectional area of the outlet opening, the counterweight means acting to pivot the throttling unit in a first direction toward its inactive position, and

hydrostatic pressure detector means connected to the counterweight means for pivoting the throttling unit in an opposite second direction to a throttling position at least partially closing the outlet opening in response to an increase in head pressure of fluid in the container in excess

of a predetermined threshold level so that the cross-sectional area of the outlet opening is functionally related to head pressure of fluid in the container.

4,694,855

DRILL PIPE INSIDE BLOWOUT PREVENTER

Robert A. Cunningham, Bellaire, Tex., assignor to Hughes Tool Company - USA, Houston, Tex.

Continuation of Ser. No. 655,282, Sep. 28, 1984, abandoned. This application May 23, 1986, Ser. No. 869,833

Int. Cl.[4] F16K *15/04*

U.S. Cl. 137—519.5 **10 Claims**

10. An inside blowout preventer for use in a drill string comprising in combination:

a valve body having upper and lower ends for connection to the drill string;

a longitudinal passage extending through the body with an upper inlet and a lower outlet for the passage of fluid, having an upper section tapering gradually to a central section with a larger flow area and a lower section tapering gradually downwardly from the central section to a smaller flow area portion;

a ball seat located in the upper section and facing toward the outlet, the length of the upper section being substantially greater than the diameter of the seat;

a ball storage member having an upper end containing a concave socket facing the inlet for snugly receiving the ball and located in the central section of the longitudinal passage;

in case of upward flow from the outlet to the inlet of sufficient velocity, the ball being movable from the socket to the seat; and

a generally tooth-shaped guide member projecting upwardly from an edge of the socket for guiding the ball into the socket.

4,694,856

FLUID CONTROL DEVICE PARTICULARLY USEFUL IN LIQUID TRANSFUSION APPARATUS

Saul Leibinsohn, 11 Olei Hagardom Street, Rishon Lezion, Israel

Filed Nov. 7, 1985, Ser. No. 795,861

Claims priority, application Israel, Nov. 23, 1984, 73598

Int. Cl.[4] F16K *7/06;* **A61M** *5/16*

U.S. Cl. 137—555 **3 Claims**

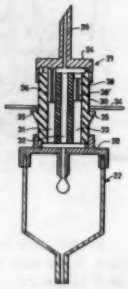
1. A fluid flow control device connectable in a line for controlling the flow of fluid therethrough, comprising:

an inlet connector and an outer connector;

a flexible conduit defining at least three passageways in side-by-side relation extending in parallel between said inlet and outlet connectors to provide at least three parallel paths for the flow of the fluid therebetween;

one of said passageways having a full, unrestricted flow rate;

a restrictor in each of the other two passageways for restricting the flow therethrough according to fixed predetermined rates lower than that of said one passageway;



a pivotable clamp receiving said flexible conduit and having a cam member shaped such as to close the center passageway and one end passageway in one pivoted position, the center passageway and other end passageway in another pivoted position, and to open all said passageways in a third pivoted position;

said pivotable clamp having a lower arm carrying indicia markings identifying the flow rate of the device according to the pivoted position of the lever arm.

4,694,857

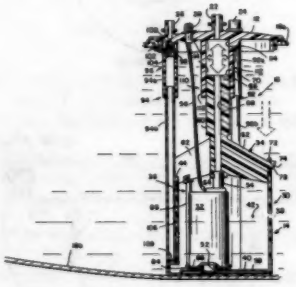
FUEL SENDER UNIT

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Mar. 31, 1986, Ser. No. 846,080

Int. Cl.[4] F04B *39/12*

U.S. Cl. 137—565 **37 Claims**



1. A fuel sender unit for delivering fuel from a fual tank having a bottom wall, the fuel sender unit comprising

a support fixtures mounted on the fuel tank,

sending means for pumping fuel in the fuel tank toward a point of use outside the fuel tank, the sending means being situated within the fuel tank, and

extensible means for coupling the sending means to the support fixture so that said sending means is movable within the fuel tank in relation to the support fixture in response to fuel pressure generated during operation of

the sending means to reach and pump fuel accumulating along the bottom wall of the fuel tank.

4,694,858

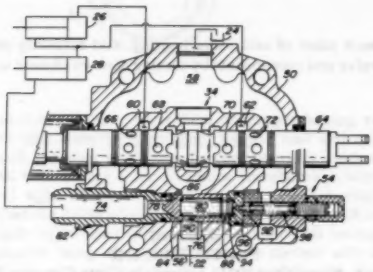
HYDRAULIC CONTROL VALVE

Gary Sutton, Augusta, Ga., assignor to General Signal Corporation, Stamford, Conn. and Dempster Systems, Inc., Knoxville, Tenn.

Division of Ser. No. 683,823, Dec. 19, 1984, Pat. No. 4,642,019. This application Aug. 29, 1986, Ser. No. 901,684

Int. Cl.[4] F15B *13/06*

U.S. Cl. 137—596 **5 Claims**



1. In a control valve including a housing having an inlet passageway, an exhaust passageway, two motor passageways and a moveable valve element having a first position in which one motor passageway is placed in fluid communication with the inlet passageway and the other motor passageway is placed in fluid communication with the exhaust passageway, an opposite second position in which the other motor passageway is placed in fluid communication with the inlet passageway and said one motor passageway is placed in fluid communication with the exhaust passageway, and a third position in which each motor passageway is isolated from the other three passageways, the improvement comprising:

a third motor passageway in said housing and a combination sequence and regeneration valve in fluid communication with said third motor passageway and said inlet passageway for preventing fluid communication between said third motor passageway and said inlet passageway when the pressure in said inlet passageway is below the first predetermined amount and for permitting bidirectional fluid communication between said third motor passageway and said inlet passageway when the pressure in said inlet passageway exceeds said first predetermined amount.

4,694,859

UNDERSEA HYDRAULIC COUPLING AND METAL SEAL

Robert E. Smith, III, Stafford, Tex., assignor to National Coupling Company, Inc., Stafford, Tex.

Filed Nov. 25, 1985, Ser. No. 801,477

Int. Cl.[4] F16L *29/00*

U.S. Cl. 137—614.04 **21 Claims**

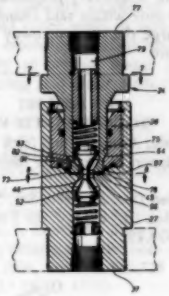
1. A coupling, comprising:

(a) a body having a first longitudinal bore, said first bore having a circumferential shoulder therein;

(b) a retainer adapted to be inserted into a first end of said first longitudinal bore and to seat on said shoulder, said retainer having a second longitudinal bore;

(c) a probe adapted to be inserted through said second longitudinal bore ane into said first longitudinal bore; and

(d) a reusable annular metal seal insertable into said first longitudinal bore to be interposed between said shoulder and said retainer upon insertion of asid retainer into said first longitudinal bore, said seal being configured to engage said first bore and the circumference of said probe as



said probe is inserted through said second bore and into said first bore.

4,694,860

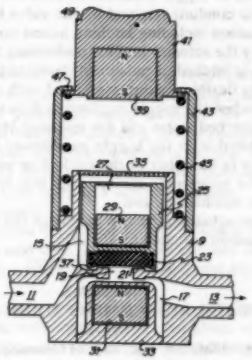
FLUID-FLOW ISOLATION AND CONTROL APPARATUS AND METHOD

Paul G. Eidsmore, 2 Blue Hill Ct., Scotts Valley, Calif. 95066

Continuation-in-part of Ser. No. 675,825, Nov. 28, 1984, Pat. No. 4,624,443, which is a continuation-in-part of Ser. No. 398,845, Jul. 16, 1982, abandoned. This application Feb. 4, 1986, Ser. No. 826,022

Int. Cl.[4] F16K *31/08*

U.S. Cl. 137—614.21 **16 Claims**



1. Apparatus for controlling the flow of fluid under pressure, comprising:

a body having first and second fluid channels therein and an aperture communicating between the first and second fluid channels;

an element mounted within the first fluid channel for selective movement into and away from engagement with the aperture for selectively forming a fluid-tight seal therewith, said element including an elongated chamber having a first dimension therewithin substantially aligned with the direction of movement of the element;

a first magnet having a second dimension substantially less than said chamber first dimension, said first magnet being slidably disposed in said chamber for movement between a first position adjacent the aperture and a second position remote from said aperture;

a second magnet positioned within the second fluid channel to magnetically urge the first magnet into said first posi-

tion and to urge the element into engagement with said aperture; and,

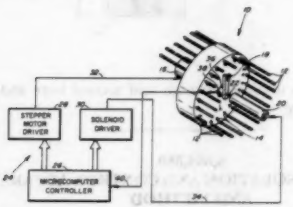
magnet means disposed external to the first and second fluid channels for selectively magnetically actuating said first magnet to slide within said chamber to said second position and urge the element away from engagement with said aperture.

4,694,861

ROTARY PINCH VALVE

David L. Goodale, Anaheim, and Nick Darden, Fullerton, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Dec. 22, 1986, Ser. No. 944,363
Int. Cl.[4] F16K *7/06;* **F16L** *55/14*
U.S. Cl. 137—624.19 **10 Claims**



1. A random-access pinch valve adapted to selectively pinch and release a plurality of fluid conduits, comprising:

a valve body adapted to retain the fluid conduits;

an actuator arm;

a plurality of toggle mechanisms associated with respective flexible conduits retained by the valve body, each toggle mechanism including latching means responsive to actuation by the actuator arm for positioning the toggle mechanisms in latched or unlatched states, and means for pinching the flexible conduit associated with the toggle mechanism when the toggle mechanism is in one of the latched or unlatched states and for releasing the flexible conduit associated with the toggle mechanism when the mechanism is in the other of the latched or unlatched states;

means for positioning the actuator arm with respect to the toggle mechanism; and

means for actuating the arm to change the state of the toggle mechanism actuated by the arm.

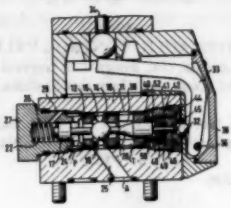
4,694,862

VALVE FOR ATTACHMENT TO AN ACTUATING MEANS

Horst Rott, Mühlbach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Mar. 7, 1986, Ser. No. 837,413
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509479
Int. Cl.[4] F15B *13/044*
U.S. Cl. 137—625.5 **9 Claims**

1. Valve for attachment to an actuating means comprising a housing defining a bore, a plurality of separate valve seat components arranged axially adjacent each other in said housing bore and clamped between a closure screw screwed to an internal thread of said housing bore and a stop, and valve elements consisting at least of a valve body cooperable with oppositely facing valve seats formed on certain of said valve seat components and an actuating pin displaceable axially with respect to said valve seat components, said actuating pin extending outwardly through said housing bore and being sealed by means of at least one seal with respect to the housing bore, said actuating pin cooperating with an external actuator, characterized in that said stop for the valve seat components is formed by a second closure screw screwed into an internal thread at the other end of said housing bore and freely adjustable in an axial direction for adjusting the spacing between a



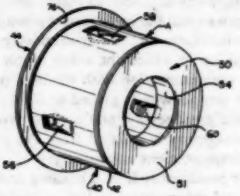
reference plane of said valve housing, said actuating pin and said valve seat components by turning the two closure screws.

4,694,863

PROTECTIVE CAP

James L. Klopp, Stow, Ohio, assignor to Cajon Company, Macedonia, Ohio

Filed Jan. 15, 1986, Ser. No. 819,237
Int. Cl.[4] F16L *57/00*
U.S. Cl. 138—96 R **22 Claims**



1. A protector for the end of a fluid conduit, said conduit including a cylindrical end portion with an inwardly extending flow passage having a generally transverse sealing face located circumferentially about the outer end thereof and a flange positioned about the exterior of the cylindrical end portion at a location spaced inwardly from the sealing face; said protector comprising:

an annular body portion having first and second ends, said first end having an inner diameter for closely receiving the cylindrical end portion of the conduit;

an end wall on said second end of said annular body portion, said end wall extending radially and axially inwardly of the annular body portion to a centrally disposed aperture opening to the interior of said annular body portion, said aperture located to be in general alignment with the flow passage of the conduit when the annular body portion receives the cylindrical end portion of the conduit, wherein said aperture has a diameter at least approximately two thirds as large as a diameter of said annular body portion; and,

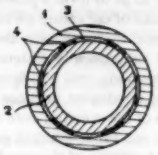
fastener means integral with said body portion for selectively holding the protector on an associated fluid conduit, said fastener means comprising a plurality of spaced resilient V-shaped tangs each having a smooth contact face means for slidingly engaging a cylindrical outer periphery of the associated fluid conduit.

4,694,864

DOUBLE-WALL TUBE FOR A HEAT EXCHANGER

Bernard Libin, Marly Le Roi, France, assignor to Novatome, Le Plessis Robinson, France

Filed Apr. 29, 1985, Ser. No. 728,420
Claims priority, application France, May 4, 1984, 84 06940
Int. Cl.[4] F16L 9/18
U.S. Cl. 138—113 8 Claims



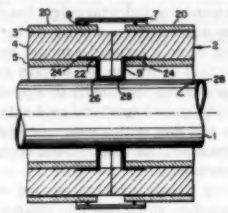
1. A double-wall tube for a heat exchanger having two fluids, the tube comprising an inner tubular wall and outer tubular wall, the inner wall being disposed coaxially inside the outer wall with a very small clearance therebetween,with a subsequent tight fit therebetween, the inner wall having a smaller diameter being adapted to come into contact with one of said fluids by an inner surface and the outer wall having a larger diameter being adapted to come into contact with the other fluid by an outer surface, and a layer of brazing metal having a thickness between 10 and 30 microns interconnecting the outer surface of the inner wall and the inner surface of the outer wall in regions which are discontinuous both in a circumferential direction and in a longitudinal direction of the tube and together represent between 5 and 15% of confronting surfaces of the inner and outer walls of the tube.

4,694,865

CONDUIT

Otto Tauschmann, Ostmarkgasse 23/9, Wien, Austria

PCT No. PCT/AT84/00038, § 371 Date Jun. 25, 1985, § 102(e) Date Jun. 25, 1985, PCT Pub. No. WO85/02003, PCT Pub. Date May 9, 1985
PCT Filed Oct. 31, 1984, Ser. No. 752,336
Claims priority, application Austria, Oct. 31, 1983, 3846/83
Int. Cl.[4] F16L 59/06
U.S. Cl. 138—148 11 Claims



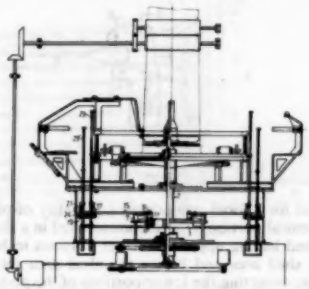
1. A conduit for transporting a liquid or a gas comprising:
a media pipe providing a conduit for the gas or liquid to be transported;
an envelope coaxially enclosing said media pipe for insulating said pipe, said envelope including a plurality of segments connected together for enclosing and insulating said media pipe; and
at least one sliding member coaxially disposed between the inner walls of said envelope and the outer walls of said media pipe, said sliding member being held in abutment between two of said segments and providing an insulating air gap between said inner walls and said outer walls, said at least one sliding member including a cylindrical sleeve having two opposing end sections connected by a middle section, said end sections contacting two of said segments in concentric arrangement therewith, said middle section having a plurality of inwardly extending portions for coaxially engaging said outer walls of said media pipe, each of said inwardly extending portions having inclining portions connected by an arcuate bridge portion, said bridge portion contacting said outer walls of said media pipe.

4,694,866

SHEDDING DEVICE FOR A CIRCULAR WEAVING MACHINE

Huang Kuo-Ching, No. 43, Bao An Village, Ren Der, Shiang, and Lin Yong-Hung, No. 5, Lane 140, Jong Jeng Rd. Gong How Villiage, Shin Gang Shiang, Jia Yih, both of Taiwan

Filed May 5, 1986, Ser. No. 859,828
Int. Cl.[4] D03D 37/00
U.S. Cl. 139—13 R 6 Claims



1. A shedding device for moving shedding rods of a circular weaving machine having a rest base, the shedding rods being for moving vertical yarns and being mounted for vertical movement to the rest base, the shedding device comprising:
a drive shaft mounted for rotation about a vertical axis;
a cam fixed to said drive shaft for rotation therewith and carrying a cam path lying in a horizontal plane;
a cam follower support;
a cam follower means connected to said follower support and engaged in said cam path for moving said cam follower support in a horizontal plane when said drive shaft is rotated;
a cantilever arm mounted to the rest base for rotation about a vertical axis for rocking in a horizontal plane, said cantiliever arm having an outer end pivotally connected to said cam follower support for holding said support at a fixed rotational position with respect to said cam;
a pair of control rods each having one end connected to said support and each having an opposite end; a pair of cranks pivotally connected to the rest base, each crank having a first arm connected to said opposite end of one control rod, each crank having a pair of second arms;
a clamp connected to each shedding rod;
a link pivotally connected to each second arm of each crank; each link being pivotally connected to one of said clamps so that, with rotation of said cam, said support and control rods move horizontally to pivot said cranks and move the shedding rods up and down; and
wherein said follower means comprise a first cam follower at one end of said support and a second cam follower at an opposite end of said support, each cam follower comprising a roller engaged with said cam path, one control rod being pivotally connected to said support adjacent one of said followers and the other control rod being pivotally connected to said support adjacent the other of said fol-

lowers, said free end of said cantilever arm being pivotally mounted to said support between said cam followers whereby said support rotates about the pivotal connection between said cantilever arm and said support and moves horizontally with vertical swinging of said cantilever arm as said cam rotates.

4,694,867

LOOM REED

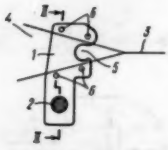
Mikhail A. Gendelman; Anatoly F. Borodulin; Diana F. Golubeva, and Sergei V. Bychkov, all of Klimovsk Moskovskoi, U.S.S.R., assignors to Klimovskoe Spetsialnoe Konstruktorskoe Bjuro Po Proektirovaniju Tkatskogo Oborudovania, Klimovsk, U.S.S.R.

Filed Oct. 7, 1986, Ser. No. 916,224

Claims priority, application U.S.S.R., Oct. 8, 1985, 3975056

Int. Cl.[4] D03D *49/62*

U.S. Cl. 139—192 **4 Claims**



1. A reed for a loom comprising a plurality of plates each having a central portion to be accommodated in a shed area of the loom and having upper and lower portions to be situated above the shed area and below the shed area respectively, means interconnecting the lower portions of the plates to align the plates in a successive row, aligned recesses in the central portions of the respective plates to be accommodated in the shed area, said recesses jointly defining an open guiding channel for accommodating the motion of an inserter through the shed of the loom and for leading out a weft thread inserted by the inserter, and projections provided on said upper and lower portions of at least some of the plates, the projections facing adjacent ones of the plates and each having a thickness which is smaller than a space between the plates.

4,694,868

APPARATUS FOR MANUFACTURING A DISC-SHAPED CURVED MAGNET COIL

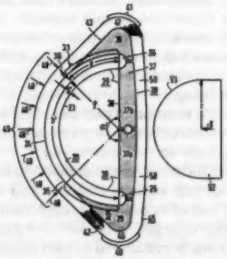
Andreas Jahnke, Forchheim; Günter Ries, and Konrad Meier, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 5, 1985, Ser. No. 805,331

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3444983; Aug. 19, 1985, 3529607

Int. Cl.[4] H01F *41/00*

U.S. Cl. 140—92.1 **15 Claims**



1. Apparatus for manufacturing a disc-shaped curved magnet coil, for a system for at least one of accelerating and storing electrically charged particles, wherein the conductors of the coil to be made are arranged about a winding core which is curved along a central arc length (b) with at least approximately constant spacing (2D) between long sides thereof having a curvature and wherein said conductors are fixed in position about the winding core, comprising an approximately lens-shaped fitting piece as a coil form added to the concave inside of the winding core so as to form a provisional winding body with only positive radii of curvature on outsides thereof, the conductors being wound under tension about said provisional winding body and subsequently fastened only to the winding core of the winding body, said coil form being removable whereby the exposed conductor portions facing the region of the concave inside of the winding core may be pressed against the concave inside and the conductor portions fixed in position against the concave inside of the winding core.

4,694,869

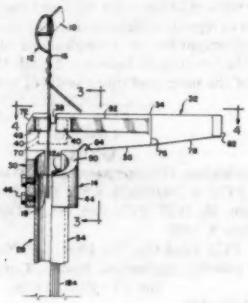
TOOL FOR WRAPPING DROP WIRES FOR SUSPENDED GRID CEILING

Otis Wolford, Jr., 1105 N. Meadow La., Mt. Prospect, Ill. 60056, and Richard P. Wolford, 55 Payson Ct., Hoffman Estates, Ill. 60194

Filed May 12, 1986, Ser. No. 862,469

Int. Cl.[4] B21F *7/00*

U.S. Cl. 140—119 **18 Claims**



1. A tool for positioning and wrapping a hanger wire, having tension and wrap sections connected together across a bend section, onto and to an overhead support member, initially with the bend section overlying the support member and the tension and wrap sections then being on opposite sides of the support member and spaced apart and each extended below the support member, and then with a wrap configuration underlying the support member, the combination comprising

an elongated member;

means extending axially upward beyond one end of the elongated member, along one side thereof;

a slot open downwardly from an upper edge of the axially extending means and extended radially of the elongated member,

said slot having a width sized to loosely receive the bend section on one hanger wire, and having a length extended radially of the elongated member, a distance less than the separation between the tension and wrap sections but sufficient to restrict wobble of the hanger wire as supported therein;

a finger supported off the axially extended means and projected laterally of the elongated member and the radial direction of the slot, said finger being extended from the elongated member a distance greater than the separation between the tension and wrap sections,

the tension section of a first hanger wire being received in

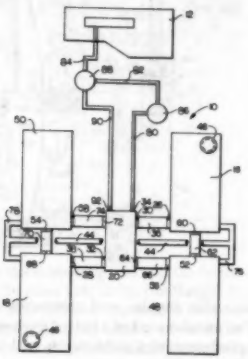
the elongated member and the bend section than being received in the slot, to stably support the wrap section spaced from the tool in a position to be hooked over the support member, upon downward movement of the tool, whereby upon rotation of the tool about the elongated member, the finger catches the wrap section under the support member and bends it over and wraps it around the tension section, to define the wrap configuration, and the tension section of the first hanger wire then being withdrawn from the elongated member from the upper end thereof.

4,694,870

VENTED FUEL SYSTEM FOR A VEHICLE

Robert M. Vize, Bettendorf, Iowa, assignor to Caterpillar Inc., Peoria, Ill.

Filed Jun. 13, 1986, Ser. No. 873,977
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—326 **14 Claims**



1. A vented fuel system for supplying fuel to the engine of a vehicle, comprising:

a first fuel storage tank having a filler spout and an outlet opening and being positioned on a first side of said vehicle;

a second fuel storage tank having a filler spout and an outlet opening and being positioned on a second opposite side of said vehicle;

a fuel sump tank having first and second fuel inlet openings and a fuel outlet opening and being positioned intermediate said first and second fuel storage tanks;

a first air transfer line connecting said first fuel storage tank to said second fuel storage tank;

first and second fuel lines connecting said first and second fuel storage tank outlet openings respectively to said first and second fuel inlet openings of said fuel sump tank; and

a vented fuel cap assembly removably secured to one of the filler spouts of said first and second fuel storage tanks.

4,694,871

PROCESS FOR THE MANUFACTURE OF PANEL-TYPE WORKPIECES WITH ASSEMBLY BORES, MORE PARTICULARLY, MADE OF WOOD OR WOOD-LIKE MATERIAL AND APPARATUS FOR PERFORMING THE PROCESS

Erwin Jeakner, Lindenstrasse 13, Gechingen, Fed. Rep. of Germany D-7261

Filed Dec. 6, 1985, Ser. No. 806,274
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1984, 3444929; Jun. 21, 1985, 3522278
Int. Cl.[4] B27M *1/08*
U.S. Cl. 144—35 R **12 Claims**

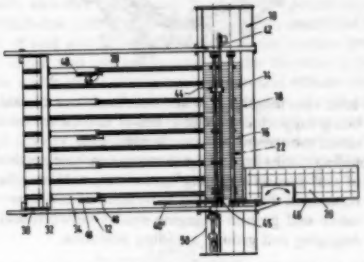
1. An apparatus for cutting panel-type workpieces and for making bores on the flat face and/or at the end faces thereof, having a frame comprising a workpiece receiving device equipped with a workpiece clamping device, a saw carriage displaceable along a straight guide relative to the workpiece receiving device and a boring device arranged in movable and settable manner on the frame, said apparatus comprising:

said saw carriage being guided beneath a workpiece support table having a saw slit formed therein;

a side stop extending substantially perpendicularly to said saw slit and being arranged on said workpiece support table proximate a first end of said saw slit;

said workpiece advancing device being further provided with a programmable workpiece slide which is transversely and horizontally adjustable in relation to said saw slit to enable splitting up of said workpieces into a plurality of panel-type sections of desired dimensions;

said workpiece advancing device further being capable of carrying a workpiece in both directions of travel of said workpiece;



said workpiece advancing device further being fixable in predetermined positions relative to said saw slit;

said boring device comprising a programmed boring device being positioned especially beneath said workpiece support table so as to automatically provide a desired preselected configuration of bores into said flat face and/or end faces of said workpieces;

said boring device being variably adjustable and lockable along a line parallel to said saw slit and further being movable in a direction of advance;

said boring device comprising at least one vertical boring head for said flat face boring and an additional boring head for end face boring which is vertically adjustable and lockable; and

said boring device being further provided with two oppositely arranged and oppositely movable boring spindles extending in a horizontal plane transversely to said saw slit.

4,694,872

HIGH PERFORMANCE DRIVE TIRE ARRANGEMENT FOR AGRICULTURAL TRACTORS

Thorvald G. Granryd, 1260 N. Western Ave., Lake Forest, Ill. 60045

Filed Aug. 5, 1985, Ser. No. 757,342
The portion of the term of this patent subsequent to Sep. 6, 2000, has been disclaimed.
Int. Cl.[4] B60C *27/20*; A01B *33/00*
U.S. Cl. 152—216 **13 Claims**

1. Traction intensifying means for a rubber tired vehicle having a power driven wheel, including a tire, a rim and a hub, said traction intensifying means comprising

a structural member secured to the rim of the tire,

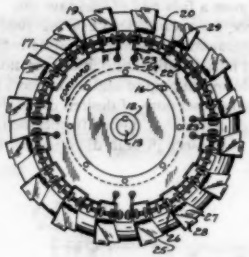
frame means secured to said structural member for forming an attachment base,

a series of ground engaging spades operatively connected to the tire in a position to be movable between ground engaging and ground avoiding positions,

each of said ground engaging spades having a base portion, a sole portion and a lug portion,

a plurality of anchor means operatively connected to said ground engaging spades to facilitate movement thereof between said ground engaging and ground avoiding positions,

each one of said anchor means being secured to said frame,



at least two lengths of wire rope, each one of said lengths being supported by said series of anchor means for rotational movement relative thereto, and

coupling means for fixedly securing said base portion of each of said ground engaging spades onto said lengths of wire rope, such that rotational movement of said wire rope will move said ground engaging spades between said ground engaging and ground avoiding positions.

4,694,873

VEHICLE WHEEL WITH RUN-FLAT SUPPORT

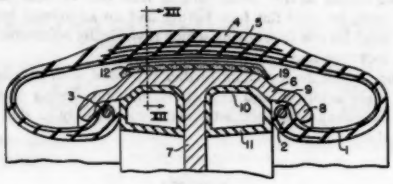
Klaus Gerloff, Isernhagen; Dieter Ehlert, Gehrden, and Klaus von der Wall, Wölpinghausen, all of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Jan. 10, 1986, Ser. No. 818,536

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1985, 3501116

Int. Cl.[4] B60C *17/04;* **B60B** *21/12*

U.S. Cl. 152—380 **15 Claims**



1. A vehicle wheel on which can be mounted a pneumatic tire having a tread as well as a belt below said tread, with the wheel being suitable for use during emergency operation of the tire; the tire is essentially comprised of rubber or rubber-like synthetic material, and has a carcass that is anchored in beads of the tire by being looped around bead cores; the inside of the tire is provided with an air-impermeable layer; the wheel is provided with a rigid rim that includes an emergency-operation element upon which the inner surface of the tire is supported during emergency operation of the tire; said wheel further comprises:

at least one friction strip disposed on the radially outer side of said emergency-operation element; said friction strip extending further radially outwardly than do any parts of said rim and emergency-operation element, so that during emergency operation of said tire, the latter is supported by said friction strip; said friction strip being rotatably supported on said emergency-operation element; and

lateral guide elements integral with said friction strip and extending in circumferential direction of said rim as well as extending over sides of said emergency-operation element in a direction angularly inwardly and away from said tread and said belt.

4,694,874

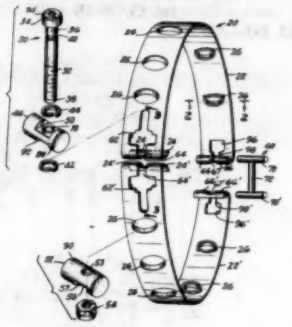
WHEEL WELL OBSTRUCTOR FOR A WHEEL RIM

Basil D. White, Lauder Hill, Fla., assignor to Tyron, Inc., Fla.

Filed Nov. 22, 1985, Ser. No. 801,061

Int. Cl.[4] B60B *21/00, 21/12*

U.S. Cl. 152—381.5 **20 Claims**



1. A removable annular well obstructor for obstructing the interior of an annular well of a hub of a wheel rim, wherein said well has a predetermined radial depth, said obstructor comprising:

an annular band of inextensible material of a predetermined axial width having an opening through its circumference, said band having a thickness substantially less than the depth of said well and being adapted to circumferentially surround said well;

said band further having a plurality of radially and inwardly projecting hollow protrusions of a predetermined height spaced apart around the circumference of said band and adapted to be received into said well, each of said hollow protrusions having curved walls arranged about a central opening, said curved walls being being connected to one another edgewise to form a continuous perimeter about said central opening;

and means for tensionably retaining said well obstructor on said hub.

4,694,875

TIRE-MOUNTING APPARATUS

Eickhart Goebel, Pfungstadt, Fed. Rep. of Germany, assignor to Gebr. Hofmann GmbH & Co. Kg Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany

Filed Jan. 18, 1985, Ser. No. 692,425

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1984, 3401476

Int. Cl.[4] B60C *25/10*

U.S. Cl. 157—1.24 **18 Claims**

1. A tire-mounting apparatus for mounting a tire having two beads on a rim in a tire/rim assembly where the rim has two opposed flanges that are bent radially inwards to define a drop center, and where the beads of the tire extend over the rim and are located behind the rim flanges in the drop center, said apparatus comprising:

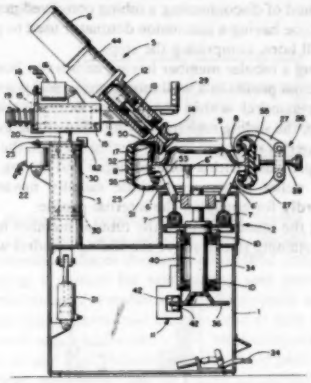
a base;

rim-mounting means for rotatably mounting the rim to said base;

clamping means for retaining the beads of the tire on a radially inner side of the rim flanges;

mounting means having a mounting tool for forcing one of the tire beads over one of the rim flanges, into the drop center and radially outwards onto said radially inner side of the rim flanges while the beads of the tire are retained by the clamping means;

moving means for moving the tire and rim when the tire is in



contact with the mounting tool and the beads are retained on said radially inner side of the rim flanges by said clamping means so that said one tire bead is rolled over said one rim flange, into the drop center of said rim and forced radially outwards onto said radially inner side of said one rim flange, said moving means including a drive unit for rotating said mounting tool against said tire to move said tire and rim; and

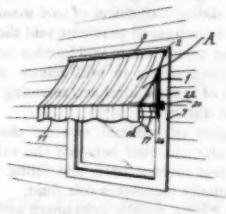
braking means for counteracting the movement of said tire and rim by said moving means, said braking means including an assembly secured to said rim-mounting means.

4,694,876

KNOCK-DOWN ADJUSTABLE AWNING CONSTRUCTION

Michael T. Bottom, Crawford County, Mo., assignor to T. J. Bottom Industries, Inc., Cuba, Mo.

Filed Jun. 14, 1985, Ser. No. 744,632
Int. Cl.[4] E04F *10/00*
U.S. Cl. 160—45 **2 Claims**



1. A knock-down awning construction for treatment of a wall opening comprising a flexible curtain, an upper mounting strip, means securing said strip upon said wall upwardly of the opening to be treated, a lower transverse arm axially parallel to said mounting strip for disposition normally downwardly and outwardly thereof, means for engaging said wall for supporting said arm, means for retainingly securing the upper end portion of said curtain with said mounting strip, a tubular member integrally provided with said lower transverse arm and being axially parallel thereto, said tubular member having a downwardly directed co-extensive, slot-like opening, a rigid rod freely received within said tubular member and being axially parallel therewith, said rod being substantially co-extensive with said tubular member, said rod being normally urged gravitationally downwardly toward said slot-like opening, said rod further having a cross-section less than the inside cross-section of said tubular member for normally developing a void therebetween, the lower end portion of said curtain being directed upwardly through said slot-like opening into the said void within said tubular member and extending coveringly about said rod, and then being directed returningly downwardly and outwardly through said slot-like opening whereby the extremity of said lower end portion depends downwardly of said opening in exposed state, said curtain being relatively adjustably movable with respect to said rod to permit exposure of a preselected extent of said extremity, the combined cross-section of said rod and the thickness of the curtain portions trained about said rod within said tubular member is greater than the width of the slot-like opening in said tubular member but slightly less than the inside cross-section of said tubular member whereby said rod is upwardly shiftable but normally, through gravity, causes the lower surrounding portions of said curtain to be frictionally maintained against the slot-like opening adjacent inner portions of the tubular member in preselected condition.

4,694,877

MANUALLY OPERATED SHADE LOWERING AND RAISING MECHANISM FOR ATRIUM WALLS

Doan D. Dunbar, Columbus, Ohio, assignor to Inside Outfitters, Inc., Columbus, Ohio

Continuation-in-part of Ser. No. 752,284, Jul. 5, 1985, abandoned. This application Jul. 21, 1986, Ser. No. 887,485
Int. Cl.[4] E06B *9/204, 9/322*
U.S. Cl. 160—273 R **6 Claims**

1. A device for manually raising and lowering a shade on a wall having a vertical portion connected to a concave portion which in turn is connected to a portion approaching the horizontal, said wall being provided with at least one window extending from the vertical portion through the concave portion and into the portions approaching the horizontal, said window being provided with mullions extending throughout the length of said window on either side thereof, at least a portion of said shade being positioned adjacent both said concave portion of said wall and said portion of said wall approaching the horizontal, said device comprising:

at least one oppositely disposed, vertically extending pair of compartmentalized parallel tracks comprising a first and second track attached to said wall, the side of said mullions adjacent said window and of a shape to conform to the contour of said wall,

said compartmentalized track having a U-shaped cord guiding portion, the opening of which extends toward said windows and a U-shaped shade supporting portion, the opening of which faces the edge of said shade, and a

common wall forming the base of said cord guiding portion and a side of said shade supporting portion,

a plurality of shade supports positioned in said shade supporting portion of each of said tracks,

a shade positioned between said pair of tracks and connected to said shade supports,

said cord guiding portion of each said tracks being provided with means to prevent said cords from touching said shade and from sagging when said cords are in the concave position or in the position approaching the horizontal of said cord guiding portion of each of said tracks,

a first pulley and a second pulley positioned at the upper end of each of said tracks,

a third pulley positioned at the lower end of each of said tracks,

an endless cord positioned in the cord guiding portion of each of said tracks, said cord being positioned on said pulleys so that it engages said third pulley on said first track, then said second pulley on said first track, then said second pulley on said second track, then said third pulley on said second track in a reverse direction, then said first pulley on said second track, then said first pulley on said first track, then returning to said third pulley on said first track,

first means for securing one side of the lower portion of said shade to be raised or lowered by said device to said cord between said third pulley and said first pulley on said first track, wherein said means comprises a base portion permanently secured to a lower portion of the shade and an extension to which the cords are secured and which rides in the cord guiding portion of said track wherein said shade may be raised or lowered by manual movement of said first and a second means,

said second means for fixedly securing the other side of said lower portion of said shade to be raised or lowered by said device to said cord between said third pulley and said second pulley on said second track, wherein said means comprises a base portion permanently secured to a lower portion of the shade and an extension to which the cords are secured and which rides in the cord guiding portion of said track wherein said shade may be raised or lowered by manual movement of said first and second means.

4,694,878

DISCONNECT SUB FOR A TUBING CONVEYED PERFORATING GUN

Louis M. Gambertoglio, The Woodlands, Tex., assignor to Hughes Tool Company, Houston, Tex.

Filed Jul. 15, 1986, Ser. No. 886,273
Int. Cl.[4] E21B *23/00, 43/11*
U.S. Cl. 166—377 **7 Claims**

1. A disconnect sub for a tubing conveyed perforating gun of the type used to perforate a cased well bore, comprising:

a tubular member having a generally cylindrical exterior and an interior bore, said tubular member having an upper connecting end for connection in a tubing string extending to the well surface and a lower end;

a sliding mandrel telescopingly received within the interior bore of said tubular member, said sliding mandrel having a lower end with connecting means for engaging and supporting said perforating gun and an upper colleted end with a plurality of collet fingers which terminate in collet lugs, said fingers being expandible radially inwardly and outwardly, and wherein said interior bore is provided with an internal profile for engaging said collet lugs when said fingers are expanded radially outwardly;

a retaining sleeve received within the interior bore of said tubular member, said sleeve having a lower cylindrical extent which initially underlies said collet lugs and biases said lugs radially outwardly to engage said internal profile and define a running-in position, said retaining sleeve being movable to a release position upon upward sliding movement of said mandrel in which said fingers are disengaged to release said sliding mandrel;

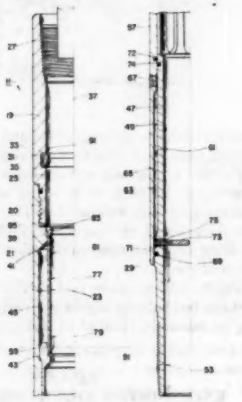
lock means within said interior bore for engaging said retaining sleeve in said release position upon upward travel of said mandrel and retaining sleeve over a predetermined distance; and

wherein said retaining sleeve is a generally cylindrical body, said body having an external surface which increases in diameter at an upper extent thereof to form a lip, said lip being received upon a ledge formed within said interior bore when said sleeve is in said running-in position.

7. A method of disconnecting a tubing conveyed perforating gun of the type having a percussion detonator used to perforate a cased well bore, comprising the steps of:

connecting a tubular member having an interior bore within an internal profile in a well tubing string and positioning a sliding mandrel within the interior bore in telescoping fashion, the sliding mandrel having a lower end connected to the perforating gun for supporting the gun, the mandrel being provided with a colleted upper end having a plurality of collet fingers expandible radially inwardly and outwardly for engaging the internal profile;

retaining the mandrel within the tubular member by installing a retaining sleeve above the sliding mandrel within the



tubular member, the sleeve being provided with a lower cylindrical extent which initially underlies said collet fingers and biases said fingers radially outwardly to engage said internal profile and define a running-in position, said retaining sleeve being movable to a release position upon upward sliding movement of said mandrel in which said fingers are disengaged to release said sliding mandrel;

providing locking means within said interior bore for engaging said retaining sleeve in said release position upon upward travel of said mandrel and retaining sleeve over a predetermined distance;

providing a region of reduced external diameter which forms an annular chamber between the exterior of said mandrel and said interior bore, and filling said chamber with a substantially incompressible fluid;

providing drain means initially containing said fluid within said chamber, said drain means including a frangible portion which extends within the internal bore of said mandrel; and

passing a weight through said tubing string from the well surface through said internal bore to sever said frangible pin and drain said chamber, said weight being allowed to continue down said internal bore to contact said percussion detonator and fire said perforating gun.

4,694,879

PROCESS FOR PRODUCING CASTINGS

Kurt Feuring, Solms-Niederbiel, Fed. Rep. of Germany, assignor to Buderus Aktiengesellschaft, Wetzlar, Fed. Rep. of Germany

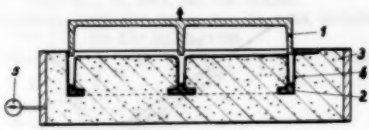
PCT No. PCT/DE85/00121, § 371 Date Oct. 1, 1985, § 102(e) Date Oct. 1, 1985, PCT Pub. No. WO85/04826, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 17, 1985, Ser. No. 787,801

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1984, 3415232

Int. Cl.[4] B22C *7/02, 9/04*

U.S. Cl. 164—7.2 2 Claims



1. A method for producing a casting having at least one vertical rib when a cross-sectional shape selected from L-, T- and combination shapes thereof, said method comprising:

providing a pattern for said casting said pattern being a combination of reusable and gasifiable parts, said reusable parts comprising a base element, and at least one vertical rib web attached thereto which is substantially perpendicular to said base element, said gasifiable parts comprising at least one horizontal rib flange connected to said rib web, a portion of said rib flange formed at an angle to said rib web;

molding a binder free molding material around said pattern to form a mold;

removing said reusable parts of said pattern from said mold; and

destroying said gasifiable parts of said pattern during introduction of casting material into said mold.

4,694,880

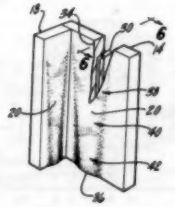
METHOD OF CONTINUOUSLY CASTING METAL SLABS

Kirk M. Gladwin, c/o Gladwin Corporation, 20401 Gladwin Ave., Taylor, Mich. 48180

Filed Sep. 16, 1982, Ser. No. 418,888

Int. Cl.[4] B22D *11/04*

U.S. Cl. 164—459 3 Claims



1. In a method of continuously casting metal including the steps of providing a continuous casting mold having a pair of opposed, spaced apart side plates and a pair of opposed, spaced apart end plates, said mold plates each having a facing, said side plate facings and said end plate facings defining a mold cavity therebetween, said mold cavity having open upper and lower ends, and continuously casting metal into the continuous casting mold by pouring molten metal into the open upper end of the cavity for cooling within said mold and for exiting from the open lower end of said mold cavity with a partially solidified skin, the improvement comprising:

said step of providing a continuous casting mold further including providing each facing of at least one pair of said opposed mold wall plates witha progressively increasing thickness between the open upper end of said cavity and the open lower end of said cavity with the rate of increase of said progressively increasing thickness being non-linear; and

providing said facings with progressively increasing thicknesses of inwardly convex configuration.

4,694,881

METHOD FOR MAKING THIXOTROPIC MATERIALS

Robert S. Busk, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 1, 1981, Ser. No. 326,304

Int. Cl.[4] B22D *17/00, 25/00*

U.S. Cl. 164—113 10 Claims

1. A process for the production of liquid-solid material comprising (a) feeding a solid material having a dendritic structure into a screw extruder; (b) passing said material through a feeding zone in the extruder; (c) heating said material to a temperature greater than its liquidus temperature as it passes through a heating zone in the extruder; (d) cooling said material to within a temperature range of greater than the solidus and less than the liquidus temperature of the material; (e) shearing said cooled material in the extruder with the screw at a force sufficient to break at least a portion of the dendritic structures as they form; and (f) removing said material from said extruder.

4,694,882

METHOD FOR MAKING THIXOTROPIC MATERIALS

Robert S. Busk, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 1, 1981, Ser. No. 326,305

Int. Cl.[4] B22D *17/00, 25/00*

U.S. Cl. 164—113 11 Claims

1. A process for producing a liquid-solid metal alloy comprising:

(a) feeding a metal alloy having a dendritic structure into the barrel of a screw extruder;

(b) heating the metal alloy to a temperature above the alloy's solidus temperature and below the alloy's liquidus temperature; and

(c) subjecting the heated metal to a shearing action provided primarily by rotating the screw, said shearing action being sufficient to break at least a portion of the dendritic structures of the metal alloy to form a liquid-solid metal alloy composition.

4,694,883

HOLLOW CORE MOLDING APPARATUS

Klaus Haiduk, Cologne, Fed. Rep. of Germany, assignor to Klöckner-Humboldt-Deutz AG, Cologne, Fed. Rep. of Germany

Continuation of Ser. No. 456,279, Jan. 6, 1983, abandoned. This application Dec. 18, 1985, Ser. No. 810,551

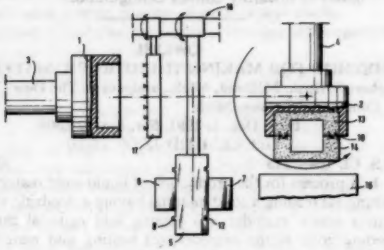
Claims priority, application Fed. Rep. of Germany, Jan. 7, 1982, 3200193

Int. Cl.[4] B22C *9/10, 9/12, 13/12*

U.S. Cl. 164—186 1 Claim

1. An apparatus for molding core halves out of mold sands comprising two core-box halves, each core half being molded on a center plate having inner hollow-mold parts and a respective outer core-box half employed therewith, and the core-box halves are fastened in alignment with spacing from each other in a horizontal plane on actuator cylinder means, and the center plate having the inner hollow-mold parts is fastened on a tool carrier, and a spray device and the center plate are arranged movably on the same tool carrier, said spray device

being pivotable between the core-box halves held with spacing from each other collectively with the core-halves therein, said spray device serving for application of a hardening adhesive directly on faces of the core halves, said center plate on the two face sides thereof having recesses and projections in alignment and located opposite to each other and which serve for molding of clamp connections on the core halves out of mold material, said core halves being cured or hardened-out in the



core-box halves before the core-box halves are moved apart and said center plate is removed, and said spray device after application of the hardening adhesive on faces of the core halves then being pivotable away from between the core-box halves which are then brought together into engagement with each other along with the core halves still located in the core-box halves so that the core halves thereupon adhered to each other are kept from deformation, and dimensioning thereof is maintained to the utmost in the finished unit.

4,694,884

MOLTEN METAL CASTING AND FEEDER SLEEVES FOR USE THEREIN

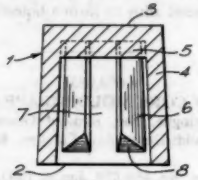
David R. Butler, Lichfield, and Clifford F. Corbett, Walsall, both of England, assignors to Foseco International Limited, Birmingham, England

Filed Mar. 28, 1986, Ser. No. 845,532

Claims priority, application United Kingdom, May 17, 1985, 8512514

Int. Cl.⁴ B22C *9/08*

U.S. Cl. 164—359 **34 Claims**



1. A feeder sleeve for use in casting molten metal in which metal is cast into a mould and having a feeder cavity defined by the feeder sleeve, the feeder sleeve having an inner surface and a plurality of discrete ribs extending inwardly from said surface and spaced one from the other around its perimeter to define a feeder cavity with an open center portion, said ribs extending substantially the full length of the inner surface and terminating at their lower ends in faces which taper to meet the inner surface, and the number and dimensions of said ribs being such that the volume of the feeder cavity is reduced by at least 20% compared to the volume of the feeder cavity of a sleeve of generally the same internal size and shape but having no ribs.

4,694,885

APPARATUS FOR CONTINUOUS CASTING OF THIN METALLIC PLATE

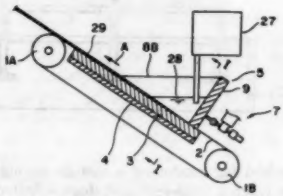
Haruo Sakaguchi; Teruyoshi Suehiro; Kunio Nagai, all of Osaka; Toshie Hashimoto, Izumi; Hisaki Nishiyama, Toyonaka, and Masakazu Mohri, Takatsuki, all of Japan, assignors to Hitachi Zosen Corporation, Osaka, Japan

Filed Apr. 30, 1986, Ser. No. 857,921

Claims priority, application Japan, Jun. 6, 1985, 60-123197; Jun. 6, 1985, 60-123198; Jul. 17, 1985, 60-157272; Sep. 4, 1985, 60-195191

Int. Cl.⁴ B22D *11/06*

U.S. Cl. 164—416 **10 Claims**



1. An apparatus for continuous casting of a thin metallic plate which includes a movable mold arranged for movement in a specified direction, and melt receiving wall means disposed on the movable mold for storing molten metal in cooperation therewith, whereby molten metal within the wall means, through its contact with the surface of the movable mold, will be cooled and formed into a casting shell, said casting shell being drawn by the movable mold in the form of a thin metallic plate, said apparatus being characterized in that at least the lower end portion of said melt receiving wall means is movable along the moving direction of the movable mold, and in that vibrating means are provided for oscillating the lower end portion of the melt receiving wall means along the moving direction of the movable mold.

4,694,886

HORIZONTAL CONTINUOUS CASTING APPARATUS

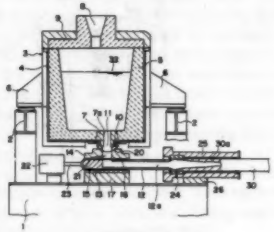
Haruo Sakaguchi, Osaka, Japan, assignor to Hitachi Zosen Corporation, Osaka, Japan

Filed Apr. 28, 1986, Ser. No. 856,820

Claims priority, application Japan, May 28, 1985, 60-114861

Int. Cl.⁴ B22D *11/04*

U.S. Cl. 164—416 **12 Claims**



12. A horizontal continuous casting apparatus comprising:

a tundish for receiving molten metal and having a discharge opening;

oscillatable nozzle means having an interior molten metal passage, said passage having an inlet end communicating with said discharge opening and having a discharge end;

guide means mounted below the tundish for slidably sup-

porting the nozzle means for horizontal reciprocating movement;

mold means slidably receiving the discharge end portion of said nozzle means; and,

vibrator means for horizontally oscillating said nozzle means relative to said tundish and to said mold means.

4,694,887

DUAL ROLL TYPE CONTINUOUS CASTING MACHINE

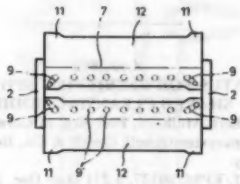
Kunio Matsui, Yokohama; Hisahiko Fukase, Tokyo, and Akihiro Nomura, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Filed May 29, 1986, Ser. No. 868,068

Claims priority, application Japan, Aug. 23, 1985, 60-185085

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—428 **6 Claims**



1. A dual roll type continuous casting machine in which a molten bath is defined at least by a pair of parallel cooling rolls and side seal plates disposed at both axial ends of said pair of cooling rolls, a core being inserted into and disposed in said molten bath, comprising nozzles located on opposite sides of the core, each nozzle including at least one molten-metal-pouring passage formed through said core, said nozzles opening between a respective side of the core and a corresponding cooling roll, and said molten-metal-pouring passages are disposed so that molten metal is fed toward said side seal plates in directions tangential to said corresponding cooling rolls.

4,694,888

ELECTROMAGNETIC LEVITATION CASTING

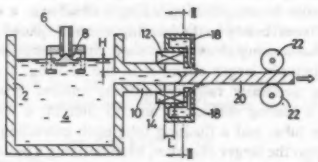
Masahiro Yoshida, Aichi, and Susumu Inumaru, Nagoya, both of Japan, assignors to Sumitomo Light Metal Industries, Ltd., Japan

Filed Jan. 30, 1986, Ser. No. 824,272

Claims priority, application Japan, Feb. 13, 1985, 60-25495

Int. Cl.[4] B22D *27/02, 11/10*

U.S. Cl. 164—467 **3 Claims**



1. An electromagnetic levitation casting process for continuously casting a flat ingot in a horizontal direction, comprising the steps of:

transferring a mass of molten metal having a composition selected from the group consisting of aluminum and aluminum alloys through a nozzle having an opening which has a rectangular cross sectional shape substantially corresponding to a transverse cross sectional shape of said flat ingot, the rectangular cross sectiontal shape of said opening having long sides extending in the horizontal direction.

causing said mass of molten metal to continuously emerge in said horizontal direction from an exit end of said nozzle;

subject the mass of molten metal which has emerged from said nozzle, to electromagnetic forces created by an upper and a lower electromagnetic coil disposed in a mutually vertically spaced-apart relationship adjacent to said exit end of said nozzle, and thereby levitating the mass of molten metal in the horizontal direction between said upper and lower electromagnetic coils for a horizontal distance of 5–20 mm from said exit end of said nozzle;

controlling a transverse width of said flat ingot with at least a pair of dam blocks, said dam blocks being located at said exit end of said nozzle such that said dam blocks extend horizontally away from the nozzle and parallel to short sides of the rectangular transverse cross sectional shape of the nozzle and said dam blocks maintain a vertical separation between said upper and lower electromagnetic coils;

solidifying the levitated mass of molten metal into said flat ingot, by direct contact of the molten mass with a cooling fluid, said cooling fluid being delivered by at least an upper water jacket and a lower water jacket, said upper and lower water jackets being located adjacent to and downstream from said upper and lower electromagnetic coils and walls defining said upper and lower water jackets being spaced apart from said mass of molten metal;

withdrawing the solidified flat ingot continuously in the horizontal direction.

4,694,889

COOLING OF MATERIALS

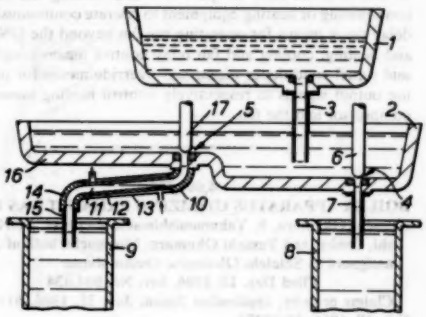
Gene D. Spenceley, Stokesley, and STeven Henderson, Middlesbrough, both of England, assignors to British Steel Corporation, Great Britain

Continuation-in-part of Ser. No. 471,847, Mar. 3, 1983, abandoned. This application Apr. 15, 1985, Ser. No. 723,508

Claims priority, application United Kingdom, Mar. 11, 1982, 8207155

Int. Cl.[4] B22D *11/10, 1/00*

U.S. Cl. 164—488 **6 Claims**



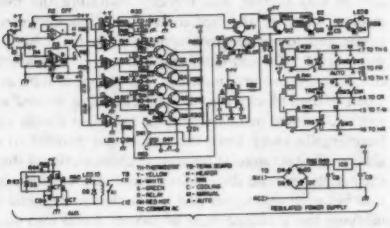
1. A method of shaping steel having a final structure of substantially globular nature including the steps of transferring liquid steel from a containing vessel and/or delivery system to a shaping station through a hollow carrier; extracting heat from the steel as it passes through the hollow carrier; subjecting the steel to turbulent flow conditions as it passes through the hollow carrier and sustaining sufficient shear rate within the steel to maintain the fluidity and globular nature of the steel emergent therefrom; and passing the fluid steel directly from the hollow carrier to the shaping station.

4,694,890

ANALOG COMPUTER VARIABLE DUTY MODULATOR

Humberto T. Zarate, Houston, Tex., assignor to Dianalog Systems, Inc., Houston, Tex.

Filed Apr. 15, 1985, Ser. No. 723,433
Int. Cl.[4] F28F *27/00*; G05D *23/00*
U.S. Cl. 165—12 5 Claims



1. An environmental temperature control system for air conditioning and heating equipment having a heating and a cooling mode, including a fan for blowing air through the equipment, a refrigeration system including a compressor and a heating system including heating means comprising a temperature sensing means for sensing temperature in a controlled space to be conditioned, signal conditioner means coupled to said temperature sensing means to buffer the signal and to provide at least two outputs, a first of said outputs being proportional to the temperature difference between the said sensed temperature and a set-point temperature of the controlled space, and a second of said outputs indicating a sensed temperature outside of a range of comfort zone temperatures, variable ON timer means for providing different ON times to said air conditioning and heating equipment responsive to said first output, said variable ON timer means also including a predetermined FIXED OFF time for said cooling mode and a different predetermined FIXED OFF time for said heating mode, a timer override means responsive to a second of said outputs of said signal conditioner means for overriding the variable timer means when said sensed temperature is outside of said comfort zone temperatures and causing the said air conditioning or heating equipment to operate continuously, fan delay timer means for operating the fan beyond the ON time, and heating, cooling and fan relay control means coupled to said signal conditioner means and override means for providing output signals to respectively control heating means, the compressor and the fan.

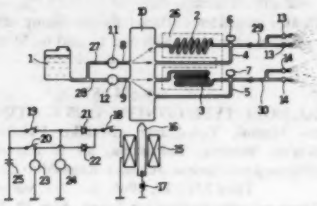
4,694,891

BOILER APPARATUS UTILIZING EXHAUST GAS HEAT

Shinichi Okumura, 9, Yakumonishimachi 4-chome, Moriguchi-shi, Osaka, and Yasushi Okumura, Moriguchi, both of Japan, assignors to Shinichi Okumura, Osaka, Japan

Filed Dec. 18, 1986, Ser. No. 944,334
Claims priority, application Japan, Jan. 31, 1986, 61-19718; Feb. 17, 1986, 61-32274
Int. Cl.[4] B60H *1/06*
U.S. Cl. 165—41 14 Claims

1. A boiler apparatus for removing a deposit of frost, snow, ice, or the like by melting same by discharging hot water, comprising a tank for storing water, a nozzle for spraying water, a two-way switchable valve provided in passage connecting between said tank and the nozzle, a pump provided in passage connecting between the tank and a supply port of said valve, at least one pair of heater tube and by-pass tube which are respectively connected at one end to said nozzle, said heater tube being adapted to be heated by respective output ports of the valve and at the other end to hot exhaust gas so that heated water is discharged from said nozzle when flow



passages within the valve are in communication with said heater tube.

4,694,892

APPARATUS FOR RETRIEVING SPHERICALLY SHAPED CLEANSING BODIES

Werner Borchert, Mulheim, Fed. Rep. of Germany, assignor to GEA Energiesystemtechnik GmbH & Co., Bochum, Fed. Rep. of Germany

PCT No. PCT/EP86/00137, § 371 Date Dec. 23, 1986, § 102(e) Date Dec. 23, 1986, PCT Pub. No. WO86/06823, PCT Pub. Date Nov. 20, 1986
PCT Filed Mar. 13, 1986, Ser. No. 2,598
Claims priority, application European Pat. Off., May 3, 1985, 85200701.2
Int. Cl.[4] F28G *1/12*
U.S. Cl. 165—95 8 Claims

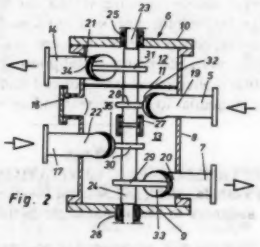


Fig. 2

6. Apparatus for retrieving generally spherically shaped cleansing bodies circulating with cooling water in a flow circuit including a tubular heat exchanger, the apparatus comprising a tubular housing having a longitudinal axis, a sieve plate disposed transversely to the housing axis and spaced from axial ends of the housing so as to form a relatively smaller chamber and a relatively larger chamber in the housing, a drain tube extending generally radially into the smaller chamber and defining a sealing surface at an end thereof, a feed tube, a discharge tube, and a flushing tube each extending generally radially into the larger chamber, each defining a sealing surface at an inner end of the respective tube, first and second, independently rotatable shaft means axially extending into the housing, valve plates mounted to the first shaft means for rotation therewith and positioned to sealingly engage the sealing surfaces of the drain tube and the feed tube when positioned thereagainst, valve plates mounted to the second shaft means for rotation therewith and positioned to sealingly engage the sealing surfaces of the discharge tube and the flushing tube when positioned there against, and means for independently rotating the first and second shaft means from an exterior of the housing.

4,694,893

UNIT FOR GUIDING THE FLOW OF COLD GAS IN STEAM GENERATORS OF HIGH-TEMPERATURE REACTORS

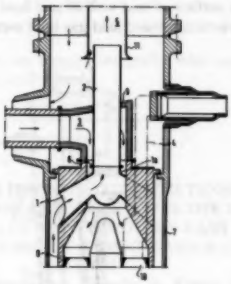
Gerd Pollak, Gummersbach, Fed. Rep. of Germany, assignor to L. & C. Steinmüller GmbH, Gummersbach, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 868,242

Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519038

Int. Cl.[4] F28F *9/22*

U.S. Cl. 165—104.34 **6 Claims**



1. A unit for guiding the flow of cold gas from the annular chamber that is disposed between the pressure tank wall and the steam generator wall to the circulation fan of a steam generator of a high-temperature reactor, with hot gas being adapted to be supplied to said steam generator wall via a hot gas guide mechanism; said unit further comprising:

compensating tube bundles associated with said steam generator wall, with said compensating tube bundles having an upper end when viewed in the direction that gases rise;

a plurality of cold gas channels that pass through said upper end of said tube bundles and are adapted to receive cold gas from said annular chamber between said pressure tank wall and said steam generator wall; and

a riser for receiving cold gas from said cold gas channels and conveying said cold gas to said circulation fan, with said pressure tank having a central axis and said hot gas guide mechanism having a portion that extends parallel to said central axis of said pressure tank, and with said riser being disposed in said portion of said guide mechanism that extends parallel to said central axis of said pressure tank.

4,694,894

HEAT EXCHANGERS

Masahiro Kito, Brighton, and Katsuhiro Mori, Hove, both of England, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 16, 1985, Ser. No. 776,669

Claims priority, application United Kingdom, Sep. 14, 1984, 8423320

Int. Cl.[4] F28F *13/00*

U.S. Cl. 165—135 **8 Claims**

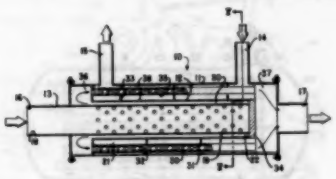
1. A heat exchanger, comprising:

a casing having a hollow cylindrical shape and provided with inlet and outlet ports;

at least one outer tube fixedly connected to and positioned within said casing;

at least one inner tube fixedly inserted into said outer tube so as to form a space therebetween and provided with a plurality of holes formed on a substantially entire circumferential surface thereof for directly spraying a first heated fluid to an inner wall of said outer tube and therethrough wherein an outer wall of said outer tube further comprises a first heat transfer surface for directly facing a second fluid to be heated passing through said casing;

passage means for said first heated fluid, said passage means being positioned between said casing and said outer tube and communicating with a first open end of said space formed between said outer tube and said inner tube and



having a second heat transfer surface for directly facing said second fluid at an outer circumferential surface of said second heat transfer surface; and

sealing means positioned in said outer tube for closing one end of said inner tube and for closing a second end of said space opposite said first open end.

4,694,895

APPARATUS FOR SECURING A COMPONENT EXPOSED TO ELEVATED TEMPERATURE TO A THERMALLY INSULATED WALL

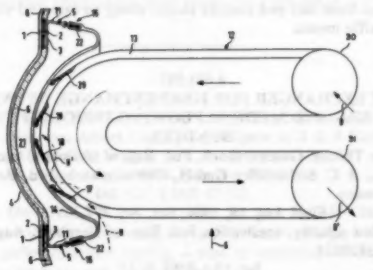
Bernhard Wöhrl, Gauting, Fed. Rep. of Germany, assignor to Motoren-und Turbinen-Union Munchen GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 18, 1986, Ser. No. 853,473

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1985, 3514378

Int. Cl.[4] F28F *13/00*

U.S. Cl. 165—136 **14 Claims**



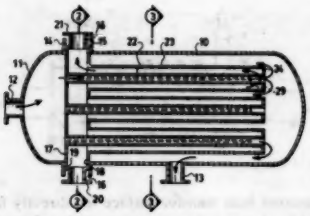
1. Apparatus for securing a component exposed to the relatively high temperature of a medium on a casing wall having thermal insulation to protect said wall from said medium, said casing wall comprising a section devoid of thermal insulation, a separate thermoelastic flexible insulating element dimensioned to fit into the section of casing wall devoid of thermal insulation, said insulating element having opposite surfaces, plates on both surfaces of said insulating element sandwiching said insulating element between said plates, means attaching one of said plates directly to the casing wall, the other plate facing inwardly of said wall and means attaching the component to said other plate.

4,694,896

HEAT EXCHANGER

Frank Navratil, 14-90 Langside Street, Winnipeg, Manitoba, Canada R3C 1Z2

Filed Oct. 22, 1986, Ser. No. 921,483
Claims priority, application Canada, Nov. 5, 1985, 494582
Int. Cl.[4] F28D 7/12
U.S. Cl. 165—142 9 Claims



1. A heat exchanger for exchanging heat between a first fluid and a second fluid, comprising a housing, means defining in said housing a first inlet and a first outlet for the first fluid and a second fluid inlet and a second outlet for the second fluid, an heat exchange core through which said fluids are arranged to pass in heat exchanging, fluid impervious relationship, said core comprising a plurality of first tubes, a plurality of second tubes, means mounting each of the first tubes inside a respective one of the second tubes and arranged so as to define for each first and second tube a first channel through said first tube having as an outer surface the inner surface of said first tube, a second channel having as an outer surface the inner surface of the second tube and as an inner surface the outer surface of the first tube and a third channel having as an inner surface the outer surface of the second tube, first manifold means for communicating said first fluid from said first inlet through said first and third channels to said first outlet and second manifold means for communicating said second fluid from said second inlet through said second channel to said second outlet, end closure means for closing said second channel at one end of said first and second tubes and baffel means dividing said second channel longitudinally, said baffle means being spaced from said end closure means whereby said second fluid travels along said second channel toward said end closure means on one side of said baffle means and returns along said second channel from said end closure means along an opposed side of said baffle means.

4,694,897

HEAT EXCHANGER FOR HEAT EXCHANGE BETWEEN HOT GAS AND MEDIUM FLOWING THROUGH TUBE BUNDLES

Gustav Thönes, Gummersbach, Fed. Rep. of Germany, assignor to L. & C. Steinmüller GmbH, Gummersbach, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,379
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1985, 3529634
Int. Cl.[4] F28F 9/22
U.S. Cl. 165—160 4 Claims

1. A heat exchanger for the heat exchange between a hot gas and a flowing medium that is conveyed in tube bundle heat transfer surfaces, comprising:

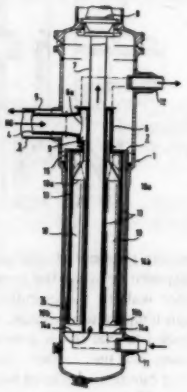
a pressure tank having a wall and connecting means for gas circulation;

a heat exchanger vessel disposed in said pressure tank, with said heat exchanger vessel having a wall, gas inlet means, and gas outlet means;

tube bundles disposed within said wall of said heat exchanger vessel and having said heat transfer surfaces for receiving hot gas from said gas inlet means of said heat exchanger vessel and said pressure tank, with said tube bundles also having inlet and outlet means for said flowing medium and gas outlet means for gas leaving said tube bundles;

hot gas conduit means that communicate with said gas inlet means of said heat exchanger vessel, with said hot gas conduit means opening into said heat exchanger vessel wall from the side, with an annular chamber being disposed within said vessel wall between said gas inlet means of said vessel and said tube bundles;

gas deflection means disposed downstream from said gas outlet means of said tube bundles for deflecting the direction of flow of gas in such a way that gas leaving said tube bundles via said gas outlet means thereof first flows along the outer surface of said wall of said heat exchanger vessel in the direction toward said gas inlet means of said vessel,



and then flows in the opposite direction along the inner surface of said wall of said pressure tank in the direction toward said gas outlet means of said tube bundles;

a riser disposed in said heat exchanger vessel, concentric to said walls of said pressure tank and said vessel, to provide communication by being twofold deflected by said gas deflection means and via said gas circulation connecting means, with said riser providing an inward delimitation for said annular chamber, and with said riser extending from said gas circulation connecting means, in the direction of said tube bundles, to the vicinity of said gas outlet means of of said tube bundles; and

said gas deflection means essentially provide for a 180° deflection of gas between said gas outlet means of said tube bundles and said riser.

4,694,898

HEAT EXCHANGER ELEMENT COMPRISING A SINGLE AND INTEGRALLY EXTRUDED MEMBER INCLUDING AT LEAST TWO HOLLOW TUBES INTEGRALLY JOINED BY AT LEAST TWO WEBS

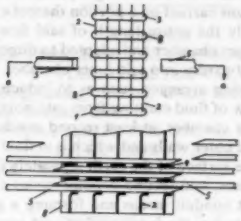
Edvin L. Clausen, Tonder, Denmark, assignor to Norsk Hydro a.s., Oslo, Norway

Filed Oct. 3, 1985, Ser. No. 783,636
Claims priority, application Norway, Oct. 17, 1984, 844137
Int. Cl.[4] F28F 1/42
U.S. Cl. 165—171 19 Claims

1. A heat exchanger element for use in forming a heat exchanger unit, said element comprising a single and integrally extruded member including:

at least two hollow tubes having parallel longitudinal axes; and

each two adjacent said hollow tubes being connected by at least two webs which extend parallel to said longitudinal



axes and which are formed integrally with each of said two adjacent hollow tubes.

4,694,899

EDGE DAM SYNCHRONIZATION AND TENSIONING CONTROL METHOD AND SYSTEM FOR THE SHAPING AND PROFILING OF CONTINUOUSLY CAST METAL SECTIONS BY MEANS OF A CONTINUOUS CASTING MACHINE

John F. B. Wood, Burlington; Timothy D. Kaiser; Jerome B. Allyn, both of Colchester; Charles D. Dykes, Milton; Frank E. Kalaskie; Robert J. Carmichael, both of Colchester, and Charles R. Simon, Williston, all of Vt., assignors to Hazelett Strip-Casting Corporation, Colchester, Vt.

Filed Dec. 3, 1986, Ser. No. 937,319

Int. Cl.[4] B22D *11/06, 11/16*

U.S. Cl. 164—452 **20 Claims**

1. The improved method of synchronizing the motion and position of the edge dams of a continuous metal casting machine in which integral, recurring contoured shapes, which may include projections, lobes, profiles, depressions, cavities and identations, are continuously cast into opposite, generally parallel edges of said product being cast, which method utilizes a twin-belt casting machine wherein a pair of moving edge dams comprising many blocks strung upon opposed parallel flexible unifying closed loops of high strength material travel along the opposed parallel edges of a casting region from its entrance to its outputs end between a pair of revolving casting belts to define a moving mold, wherein said casting belts travel downstream in the machine for carrying molten metal downstream from said entrance to become solidified and wherein said edge dams each include a plurality of identically recurring contoured shapes, which may include depressions, cavities, indentations, projections, and lobes, in order advantageously to shape the aforesaid integral, identically recurring contoured shapes being continuously cast, the method comprising:

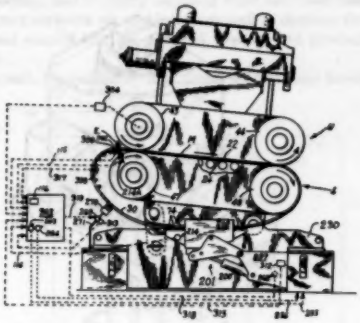
sensing the relative progress through said casting region of said continuously cast contoured shapes in said opposed pair of edge dams, by comparison between said edge dams,

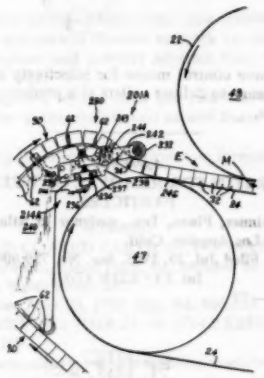
deriving a control parameter when the error in the position of said depressions or cavities between the two said edge dams departs from a range of pre-established limits,

adjustably imposing a roller tensing device against the sagging return reach of at least one of said moving edge dams, which roller tensing device contains a plurality of rollers which exert rolling contact against said moving edge dam,

adjusting, with respect to a section of at least one of said moving edge dams, the elevation of at least one aforesaid roller tensing device in response to said control parameter, thereby resulting in

synchronizing the progressive movement and position of said pair of edge dams in relation to each other, with the final result that the aforesaid integral repetitive projections or lobes of the aforesaid metal being continuously





cast will be disposed in a predetermined, consistently repetitive relationship with respect to each other.

4,694,900

DRY PELLET DISPENSING DEVICE FOR WELLS

Kelly D. Behrens, Albert City, Iowa, assignor to B & B Chlorination, Albert City, Iowa

Filed Aug. 5, 1985, Ser. No. 763,038

Int. Cl.[4] E21B *43/25*

U.S. Cl. 166—75.1 **10 Claims**

1. Apparatus for dispensing dry pellets, comprising:

(a) a pellet reservoir having a pair of oppositely inclined floor portions and a lower chamber;

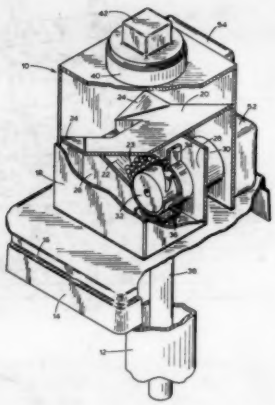
(b) tube means downwardly communicating between said lower chamber and the outside of the pellet dispensing apparatus;

(c) a metering drum mounted for rotation inside a cylindrical sleeve near an outlet end of the lower of said floor portions, and separating the upper side of said lower floor portion from said lower chamber;

(d) one or more indentations, substantially circular in cross section, in the periphery of said drum for receiving a single pellet;

(e) drive means for rotating said metering drum from a first position wherein one of said indentations receives a pellet

from said pellet reservoir to a second position wherein said pellet is delivered into said tube means; and



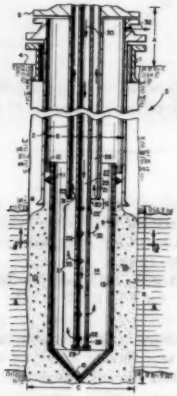
(f) responsive control means for selectively operating said drive means to deliver pellets at a predetermined adjustable rate.

4,694,901

APPARATUS FOR REMOVAL OF WELLBORE PARTICLES

James L. Skinner, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 29, 1985, Ser. No. 759,806
Int. Cl.[4] E21B *37/08*
U.S. Cl. 166—77 **10 Claims**



1. In wellbore apparatus wherein a deep wellbore passes through at least one hydrocarbon fluid producing subterranean formation and an apertured liner is carried in said wellbore adjacent said hydrocarbon fluid producing formation, said liner defining an enclosed inner chamber within said liner and an external zone which extends from the outer wall of said liner to the wall of said wellbore, the improvement comprising:

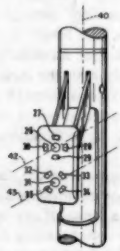
an elongated coilable tubing insertable into said wellbore, said coilable tubing being configured to include first conduit means having inner and outer walls and which is in communication with the surface of the earth and extends into said inner chamber, said first conduit means extending for a substantial portion of the length of said inner chamber, said first conduit means having a plurality of spaced apart nozzle means carried on a portion thereof extending over substantially the entire length of said first conduit means in said inner chamber and adapted to direct flow of fluid radially outwardly into said inner chamber, and said nozzle means being arranged such as to induce substantially vortex flow of fluid emitting from said nozzle means within said inner chamber, at least second conduit means having inner and outer walls and which is in fluid communication with the surface of the earth separately from said first conduit means, said second conduit means extending around said first conduit means and forming a generally annular zone between the inner wall of said second conduit means and the outer wall of said first conduit means to provide a path by which fluid and entrained solids are removed from said inner chamber by way of said second conduit means, said annular zone having a cross-sectional flow area approximately the same as the cross-sectional flow area of said first conduit means so as to maintain a flow velocity of said fluid which will substantially prevent settling out of said solid particles in said inner chamber or said annular zone, said second conduit means terminating near the top of said inner chamber close to but spaced from the point where said nozzle means first appear on said first conduit means so that said second conduit means does not overlap said nozzle means, said improvement providing for circulating fluid through the interior of said first conduit means and out through said nozzle means into said inner chamber to entrain solid particles in said circulated fluid, said fluid then being removed from said inner chamber by way of said second conduit means whereby said solid particles that pass from said external zone through said liner and collect in said inner chamber are swept out of said inner chamber by said circulated fluid as it passes from said nozzle means through said inner chamber into said second conduit means.

4,694,902

PROCEDURE AND DEVICE FOR DETERMINING THE JAMMING POINT OF A PIPE LINE IN A DRILL HOLE

Gerd Hörmansdörfer, Kastanieneck 6 A, 3167 Burgdorf-Beinhorn, Fed. Rep. of Germany

Filed Apr. 10, 1986, Ser. No. 850,266
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1985, 3512767; Feb. 18, 1986, 3605036
Int. Cl.[4] E21B *47/00*
U.S. Cl. 166—250 **18 Claims**



1. A procedure for determining the jamming point of a pipe line in a drill hole comprising passing a probe unit through said pipe line at essentially constant speed, said probe unit having a long axis, a magnetostrictive analyzer and a spring biasing said magnetostrictive analyzer against the inner surface of said pipe line with the axis of said magnetostrictive analyzer perpendicular to said long axis, imposing mechanical stress on said pipe

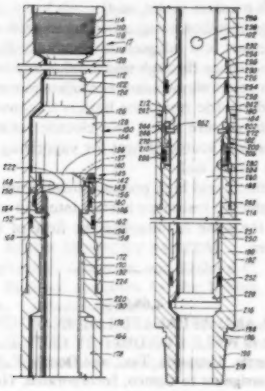
line and transmitting the mechanical stresses sensed by said magnetostrictive analyzer in different areas of said pipe line to a data processing means.

4,694,903

FLAPPER TYPE ANNULUS PRESSURE RESPONSIVE TUBING TESTER VALVE

Paul D. Ringgenberg, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 20, 1986, Ser. No. 876,967
Int. Cl.[4] E21B *47/10, 34/10*
U.S. Cl. 166—250 **2 Claims**



1. A method of pressure testing a pipe string in a well bore, comprising:
- providing a pipe string having a tubing tester valve at the lower end thereof;
- running said pipe string into said well bore;
- filling the interior of said pipe string from below with well bore fluid through said tubing tester valve;
- testing the integrity of said pipe string by applying pressure to the interior of said pipe string above said tubing tester valve thereagainst;
- sealing across the annulus between said pipe string and the wall of said well bore below said tubing tester valve with a packer;
- trapping hydrostatic pressure on the interior of said tubing tester valve in response to said sealing;
- increasing the pressure in the well bore above said packer to open said tubing tester valve;
- opposing said pressure increase with said trapped hydrostatic pressure; and
- opening said tubing tester valve only when the force resulting from said increased pressure exceeds the force resulting from said trapped hydrostatic pressure, to flow in said pipe string from above to below said tubing tester valve.

4,694,904

CYCLIC FLOODING OF A NATURALLY-FRACTURED FORMATION

M. Marc Sengul, and Steven B. Hinchman, both of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

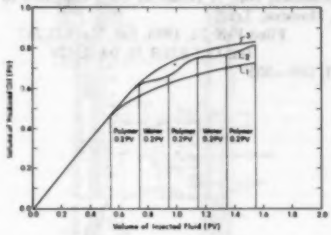
Filed Jul. 31, 1986, Ser. No. 892,524
Int. Cl.[4] E21B *43/22, 47/00*
U.S. Cl. 166—252 **15 Claims**

1. A process for recovering oil from a subterranean formation having an oil-bearing connective natural fracture network and oil-bearing matrix blocks, both in fluid communication with an injection well and a production well, the process comprising:

(a) adjusting the mobility of a fluid such that said mobility adjusted fluid substantially flows in said natural fracture network, but does not substantially flow into said matrix blocks upon injection into said natural fracture network;

(b) injecting said mobility adjusted fluid into said natural fracture network via said injection well to displace the oil in said natural fracture network toward said production well;

(c) thereafter sequentially injecting a second fluid having a



substantially higher mobility than said mobility adjusted fluid into said natural fracture network via said injection well to displace said mobility adjusted fluid toward said production well;

(d) conveying said second fluid into said matrix blocks to displace the oil therein into said natural fracture network; and

(e) recovering the displaced oil from said formation via said production well.

4,694,905

PRECURED COATED PARTICULATE MATERIAL

David R. Armbruster, Forest Park, Ill., assignor to Acme Resin Corporation, Westchester, Ill.

Filed May 23, 1986, Ser. No. 866,523
Int. Cl.[4] B05D *7/00*; B32B *27/14, 27/42*; E21B *43/267*
U.S. Cl. 166—280 **36 Claims**

1. Coated particulate material consisting essentially of particles resistant to melting at temperatures below about 450° F., said particles individually coated with one or more layers of a cured resin selected from the group consisting of:

(a) the combination of a phenolic resin and a furan resin; or

(b) the terpolymer of a phenol, furfuryl alcohol and an aldehyde.

4,694,906

METHOD FOR EMPLACEMENT OF A GELATINOUS FOAM IN GAS FLOODING ENHANCED RECOVERY

Richard D. Hutchins, Placentia, and Hoai T. Dovan, Fullerton, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Aug. 30, 1985, Ser. No. 771,283
Int. Cl.[4] E21B *33/13*
U.S. Cl. 166—294 **43 Claims**

1. A method for reducing the permeability of the higher permeability zones of a subterranean reservoir having heterogeneous permeability and being penetrated by at least one well, said method comprising:

(1) injecting through a well and into a subterranean reservoir:

(a) an aqueous liquid solution comprising:

(1) a water-soluble or water-dispersible polymer;

(2) a crosslinking agent for the polymer capable of reacting with the polymer to produce a gel;

(3) a source of hydroxyl ions in an amount sufficient to retard the reaction of the polymer with the crosslinking agent;

(4) a water soluble surface active agent;

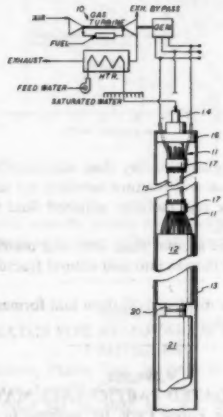
(b) a foam enplacement gas comprising an acid gas; and
(c) allowing a gelatinous stable foam having stiffened foam films of crosslinked polymer to form in the higher permeability zones.

4,694,907

THERMALLY-ENHANCED OIL RECOVERY METHOD AND APPARATUS

Charles R. Stahl, Scotia, N.Y.; Michael A. Gibson, and Christian W. Knudsen, both of Houston, Tex., assignors to Carbotek, Inc., Houston, Tex.

Filed Feb. 21, 1986, Ser. No. 832,267
Int. Cl.[4] E21B *36/04, 43/24*
U.S. Cl. 166—303 **24 Claims**



1. A method of stimulating the flow of oil from a reservoir formation traversed by a bore hole, comprising
providing an above-ground hydrocarbon powered turbine-driven electric generator to produce electrical power,
supplying water in heat exchange relation to the exhaust from said turbine to produce pressurized hot water simultaneously with said power generation,
positioning electric heating means in said bore hole between the surface and the point of discharge to said formation and energizing the same by power from said generator,
positioning an injection tube in said bore hole adjacent to said heating means,
said electric heating means comprising a plurality of electric resistance heaters, completely insulated electrically from injected water and formation fluids positioned circumferentially about said hot water injection tube,
said injection tube comprising a small-diameter insulated tube enclosed at the bottom and having orifices in the side wall adjacent to said electric heating means,
injecting said pressurized hot water from the surface down the bore hole through said injection tube to expand said water to reservoir pressure, while maintaining a high hydrostatic pressure thereon, and in heat exchange with said electric resistance heaters to convert said water into high pressure steam, said electric resistance heaters being the sole source of heat for vaporizing said pressurized hot water, and
directing said high pressure steam from said electric resistance heaters into said oil reservoir to heat the same and stimulate the flow of hydrocarbons therefrom.

19. An injection-heater for injecting high-pressure steam into a well formation comprising
an elongated axially extending tubular member adapted to be secured on the lower end of a conduit supported in a well bore,
said tubular member being enclosed at its bottom end and having a series of apertures in its side wall adjacent thereto,
heating means comprising a plurality of elongated electric heating elements circumferentially disposed about said tubular member bottom end adjacent to said apertures,
said electric heating means comprising a plurality of electric resistance heaters, completely insulated electrically from injected water and formation fluids positioned circumferentially about said tubular member,
(said tubular member being adapted to receive water conducted from the surface through said conduit and to expand said water to well formation pressure and inject same into contact with said heating means to convert the water into high pressure steam, and)
said tubular member being adjacent to said electric resistance heaters and adapted to receive water conducted from the surface through said conduit and to expand said water to reservoir pressure and inject same into contact with said electric resistance heaters to convert the water into high pressure steam, said electric resistance heaters being the sole source of heat for vaporizing said pressurized hot water, and
means to direct said high pressure steam from said (heating means) electric resistance heaters into said well formation to heat the same to stimulate the flow of hydrocarbons therefrom.

4,694,908

METHOD AND APPARATUS OF INJECTING FLUID INTO A WELL CONDUIT BY COIL TUBING

Arthur J. Morris, Magnolia, Tex., and Donald E. Newton, Marrero, La., assignors to Camco, Incorporated, Houston, Tex.

Filed Oct. 27, 1986, Ser. No. 923,452
Int. Cl.[4] E21B *43/00*
U.S. Cl. 166—310 **10 Claims**

6. An injector valve for use on coil tubing for injecting fluid into a well conduit comprising,
a body having connecting means for connection to a coil tubing,
said body including a fluid passageway for receiving injecting fluid, and has a fluid outlet connected to the fluid passageway,
a piston actuated valve positioned in the fluid passageway upstream of the fluid outlet,
biasing means acting on the valve in a direction to close the valve,
said piston subject to fluid pressure in the fluid passageway acting in a direction to open the valve, and
said fluid outlet directed outwardly from the body around

the body circumference for circumferentially spraying the interior circumference of a well conduit.

10. The method of injecting fluid into a well conduit by coil tubing comprising,

inserting a coil tubing having a fluid outlet and a valve positioned in the coil tubing above the outlet into the well conduit, said valve including a piston actuator,

inserting a fluid to be injected downwardly into the coil tubing,

biasing the valve to the closed position with a sufficient force to at least balance the hydrostatic force of injection fluid in the tubing,

pressuring the fluid in the coil tubing for opening the valve by the pressure of the injecting fluid acting on the piston actuator overcoming the biasing force, and ejecting the fluid through the fluid outlet, and

vertically moving the fluid outlet relative to the well conduit while injecting the fluid into the conduit.

4,694,909

RISER SUPPORT SYSTEM

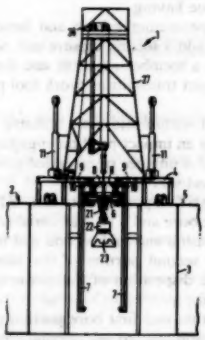
Graham W. Stephenson, Loughton, and Richard C. Toft, London, both of England, assignors to The British Petroleum Company p.l.c., London, England

Continuation of Ser. No. 573,311, Jan. 24, 1984, abandoned. This application Jun. 12, 1986, Ser. No. 873,876

Claims priority, application United Kingdom, Jan. 27, 1983, 8302292

Int. Cl.[4] E21B *7/12*

U.S. Cl. 166—359 **6 Claims**



1. An oil production system comprising:

(a) a floating vessel having a moonpool,

(b) a support system for supporting a riser running through the moonpool, and

(c) a riser adapted to be supported by (b); the support system (b) comprising;

(d) guides in the moonpool,

(e) a carriage adapted to run on the guides, the guides being fixed to the vessel so as to prevent relative rotation between the carriage and the vessel, and

(f) means for supporting the carriage the carriage (e) comprising:

(g) a pivoted support for the riser, capable of pivoting about more than one axis; the oil production system also comprising:

(h) means for permitting relative rotation about a vertical axis between at least a section of the riser and the carriage.

4,694,910

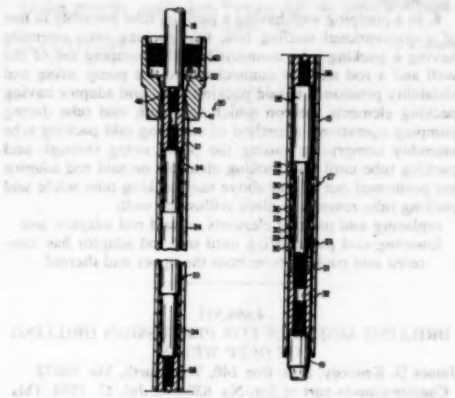
PACKING TUBE ASSEMBLY FOR PUMPING WELLS

Geoffrey F. Towner, and Charles A. Carter, both of Dallas, Tex., assignors to Texaust Australia Limited, Canberra, Australia

Filed Jun. 16, 1986, Ser. No. 874,657

Int. Cl.[4] E21B *33/03, 19/16*

U.S. Cl. 166—379 **6 Claims**



1. In a pumping well having a conventional production tubing string, a downhole pump, a sucker rod string for operating said downhole pump, a polished rod forming the upper end of said sucker rod string, and a pumping tee forming part of a wellhead; a packing tube assembly for replacing a conventional stuffing box, said packing tube assembly comprising:

a packing tube;

a rod adaptor adapted to be coupled between said polished rod and said sucker rod string and adapted to extend throughout said packing tube when positioned therein;

compressible packing means on said rod adaptor adapted to provide a seal between said rod adaptor and said packing tube when said rod adaptor is in position within said packing tube;

stabilizing means on said rod adaptor adapted to engage said packing tube to stabilize said rod adaptor within said packing tube during operation; and

a mounting bushing connected to the top of said packing tube and adapted to be threaded into said pumping tee to secure said packing tube position within said production tubing string; said bushing having a bore therethrough, said bore having a smoothly tapered interval therein which tapers downwardly and inwardly from a diameter which is greater than the diameter of the packing means in its uncompressed state to a diameter of the packing means in its compressed state which is equal to the inside diameter of said packing tube whereby said rod adaptor with said packing means thereon can be inserted into said packing tube through the upper and thereof without damaging said packing means.

5. A method of converting a conventional stuffing box-equipped pumping well to a packing tube-equipped well comprising:

disconnecting the polished rod of the pumping well from the sucker rod string while suspending said sucker rod string within the well by the use of slips;

unthreading the conventional stuffing box from the pumping tee of the well and removing the stuffing box;

attaching the polished rod to the upper end of a rod adaptor of a packing tube assembly, said rod adaptor having packing elements thereon;

inserting said rod adaptor with said polished rod attached into the packing tube of said packing tube assembly;

aligning said packing tube assembly with said sucker rod string;

connecting the lower end of said rod adaptor to said sucker rod string;

removing said slips and lowering said packer tube assembly through said pumping tee; and

connecting the upper end of said packing tube to said pumping tee.

6. In a pumping well having a packing tube assembly in lieu of a conventional stuffing box, said packing tube assembly having a packing tube connected to the pumping tee of the well and a rod adaptor connected into the pump string and slidability positioned in said packing tube, said adaptor having packing elements thereon which seal with said tube during pumping operations, a method of servicing said packing tube assembly comprising: raising the pump string through said packing tube until said packing elements on said rod adaptor are positioned out of and above said packing tube while said packing tube remains in place within the well;

replacing said packing elements on said rod adaptor; and

lowering said pump string until said rod adaptor has reentered said packing tube from the upper end thereof.

4,694,911

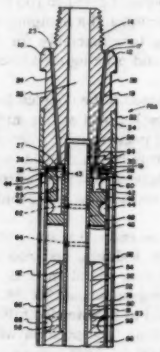
DRILLING ASSEMBLY FOR PERCUSSION DRILLING OF DEEP WELLS

James D. Kennedy, P.O. Box 140, Wentworth, Mo. 64873

Continuation-in-part of Ser. No. 630,670, Jul. 13, 1984. This application Feb. 25, 1985, Ser. No. 705,222

Int. Cl.[4] B25D *17/14*

U.S. Cl. 173—62 **12 Claims**



1. A percussion drill assembly for down hole drilling, comprising:

an elongated chamber defining a barrel assembly;

a top sub assembly connected to one end of said barrel assembly and having passage means therein including a flushing passage and separate intake and fluid exhaust passages sealed from the flushing passage;

a driver sub assembly connected to the other end of said barrel assembly;

a hammer assembly disposed within said chamber and having an axially extending flushing passage therein and fluid intake and fluid exhaust passages, said hammer assembly being disposed within said barrel assembly for reciprocal motion therein;

an anvil and bit shank assembly disposed within said chamber and having an axial flushing passage disposed within said driver sub assembly; said anvil and bit shank assembly adapted to be impacted upon by said hammer assembly;

a fluid distributing means disposed within said barrel assembly to receive an operating fluid for causing reciprocal movement of said hammer assembly; said barrel assembly having passage means for interconnecting the fluid intake passages of the top assembly and the hammer assembly through the fluid intake passages of the distributing means and the fluid exhaust passages of the top sub assembly and the hammer assembly through the exhaust passages of the distributing means, and

a tube extending through the flushing passage of said distributing means and said hammer assembly for passing a flushing fluid therethrough separate from said operating fluid.

4,694,912

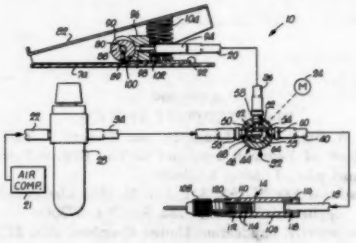
CONTROLLED IMPACT POWER TOOL

Donald A. Glaser, Emporia, Kans., assignor to Glendo Corporation, Emporia, Kans.

Continuation of Ser. No. 667,074, Nov. 1, 1984, abandoned, which is a continuation of Ser. No. 413,541, Aug. 13, 1982, abandoned. This application Feb. 28, 1986, Ser. No. 836,224

Int. Cl.[4] B25D *9/26*

U.S. Cl. 173—115 **6 Claims**



1. An impact power tool for use in delicate handworking operations including:

a hand-held device having

a tubular body presenting a bore and having a first tool mounting end and a second closure end, said body being provided with a member adjacent said first end for supporting an impact transmitting work tool projecting from the body,

a piston received within said bore shiftable along a stroke length between an impact position engaging said member and any one of a number of extended positions between said member and said second end,

said bore defining a first portion between said piston and said first end of the bore and a second variable length portion between said piston and said second end of said bore, the length of said second portion of the bore varying as a function of the disposition of the piston in the extended positions therein;

spring means within said first bore portion of the body for biasing said piston toward said second end of the bore;

a source of motive fluid pressurized to a certain, maximum positive value;

means coupling said source of motive fluid to said body for communication with said second bore portion thereof for maintaining a positive pressure condition at all times within said second portion of the bore during use of said device and for direct impingement of said motive fluid on said piston,

said body being provided with port means therein operable to maintain fluid communication of said first portion of said bore with the atmosphere during operation of the device,

said certain, positive pressure value of the fluid of said source being sufficient to cause the pressurized fluid to overcome the bias of said spring means and effect shifting of said piston toward and into said impact position thereof engaging said member; and

means for intermittently, cyclically, lowering the pressure of said motive fluid in said second portion of said bore to any

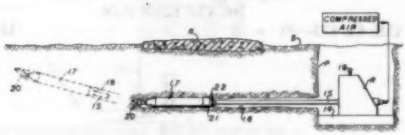
one of a number of reduced, preselected levels each of which is below said maximum value and above atmospheric and each of which allows the spring means to return the piston from said impact position to an extended position which is determined by the magnitude of the reduced pressure level, each of said reduced pressures being sufficient to overcome the bias of said spring means as said piston moves toward said end of the body to interrupt such movement and restrict the piston to an extended position preventing said piston from shifting fully to said second end, said pressure lowering means including selectively positionable means being movable by the tool user into selected positions each of which causes the pressure of said motive fluid in said second portion of the bore to be reduced to a different, reduced level which is above atmospheric pressure, thus allowing selective variation of the distance of said extended position from said impact position depending on the position of the selectively positionable means in order to vary the amount of impact energy imparted to said impact member by said piston during travel thereof into said impact position.

4,694,913

GUIDED EARTH BORING TOOL

William J. McDonald; Gerard T. Pittard; William C. Maurer; Michael R. Wasson, and William C. Herben, all of Houston, Tex., assignors to Gas Research Institute, Chicago, Ill.

Filed May 16, 1986, Ser. No. 863,957
Int. Cl.[4] E21B *4/14, 4/20, 7/08*
U.S. Cl. 175—61 **26 Claims**



1. A controllable tool for drilling holes in the earth comprising

a hollow elongated rigid supporting drill pipe having a forward end for entering the earth,

means supporting said drill pipe for earth boring or piercing movement, including

means for moving said drill pipe longitudinally for penetrating the earth,

said drill pipe moving means being constructed to permit addition and removal of supporting drill pipe during earth penetrating operation,

a boring mole supported on the forward end of said hollow low drill pipe comprising

a cylindrical housing supported on and open to the forward end of said drill pipe,

a first means on said front end for applying a boring force to the soil comprising an anvil having a striking surface inside said housing and a boring surface outside said housing,

a second means comprising a reciprocally movable hammer positioned in said housing to apply a percussive force to said anvil striking surface for transmitting a percussive force to said boring force applying means, and

means permitting introduction of air pressure supplied through said hollow pipe into said housing for operating said hammer and for discharging spent air from said housing to the hole being bored, and

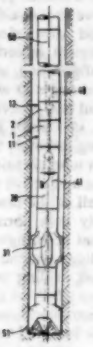
said tool being operable to penetrate the earth upon longitudinal movement of said drill rod by said longitudinal rod moving means and operation of said mole by reciprocal movement of said hammer.

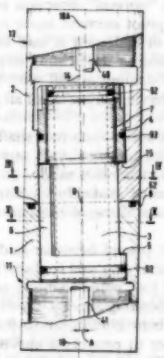
4,694,914

DRILLING STRING FOR DRILLING A BENT BORE, A METHOD OF USING SAID STRING, AND A BENDING DEVICE USED IN SAID STRING

Georges Obrecht, Seyssins, France, assignor to Alsthom, Paris, France

Filed Jul. 23, 1986, Ser. No. 888,664
Claims priority, application France, Jul. 30, 1985, 85 11608
Int. Cl.[4] E21B *7/08*
U.S. Cl. 175—61 **4 Claims**





1. In a drilling string assembly for drilling a bent bore, said string assembly having an axis at all points along its length and comprising:

a rotary drilling tool mounted via a tool shaft to the bottom of the string, said tool having a tool axis which locally constitutes the string assembly axis;

a down-hole motor assembly including a driving element driving said tool in rapid rotation relative to said string assembly;

a pivot element placed between said driving element and said tool and carrying said tool shaft for transmitting axial thrust to said tool while enabling said tool rotation;

a controllable bending device above said tool capable of taking up a bent configuration for locally bending the string in order to provide a curved length of bore, and capable of taking up a rectilinear configuration for re-establishing string rectilinearity in order to provide a straight length of bore; and

a succession of drilling tubes for transmitting axial thrust to said pivot element, and for enabling the string assembly to be slowly rotated from the surface of the ground;

said bending device comprising:

a lower sleeve having an axis which is locally the axis of said string assembly and which is fixed to said tool axis;

an upper sleeve above said lower sleeve and having an axis which is locally the axis of said string assembly; and

pivot means interconnecting said upper and lower sleeves, said pivot means having a pivot axis which slopes by the same small pivot slope angle (A) relative to the respective axes of said sleeves and holding said sleeves relative to each other and a pivot sector enabling the lower sleeve to rotate through a limited pivot sector angle (R) relative to the upper sleeve about said pivot axis, between an aligned position of said lower sleeve in which the axes of said sleeves are aligned in order to bring said device to its rectilinear configuration, and a bent position of said sleeve creating a bend angle D where; $D=2\ A\ sin\ R/2$ between the axes of said two sleeves bringing the device its bent configuration, said pivot means allowing a free passage inside the string assembly at least for a drilling mud;

the improvement wherein said column includes, beneath said bending device and above said tool, a member which rubs against the wall of the bore so that rotating said drilling string assembly in a normal direction causes a friction couple to be set up bringing said lower sleeve into abutment at said alignment end of the pivot sector, and so that rotation of said drilling string assembly in the opposite direction causes a friction couple to be set up bringing said lower sleeve into abutment at said bending end, and said bending device is placed between said driving element and the pivot element and has a coupling passing axially therethrough for transmitting motor drive to said tool shaft, said driving element driving said coupling to cause it to rotate in said "normal" direction so that friction of said shaft in said pivot element tends to drive and hold said lower sleeve in abutment at said bending end in the absence of rotation of the drilling string assembly.

3. A method of drilling a well with bends using a drilling string, said string having an access of all points along its length and comprising:

a rotary tool mounted via a tool shaft to the bottom of the string, said tool having a tool axis which locally constitutes the string assembly axis;

a down-hole motor assembly including a driving element driving said tool in rapid rotation relative to said string assembly;

a pivot element placed between said driving element and said tool and carrying said tool shaft for transmitting axial thrust to said tool while enabling said tool rotation;

a controllable bending device above said tool capable of taking up a bent configuration for locally bending the string in order to provide a curved length of bore, and capable of taking up a rectilinear configuration for re-establishing string rectilinearity in order to provide a straight length of bore; and

a succession of drilling tubes for transmitting axial thrust to said pivot element, and for enabling the string assembly to be slowly rotated from the surface of the ground;

said bending device comprising:

a lower sleeve having an axis which is locally the axis of said string assembly and which is fixed to said tool axis;

an upper sleeve above said lower sleeve and having an axis which is locally the axis of said string assembly; and

pivot means interconnecting said upper and lower sleeves, said pivot means having a pivot axis which slopes by the same small pivot slope angle (A) relative to the respective axes of said sleeves and holding said sleeves relative to each other and a pivot sector enabling the lower sleeve to rotate through a limited pivot sector angle (R) relative to the upper sleeve about said pivot axis, between an alignment end position of said lower sleeve in which the axes of said sleeves are aligned in order to bring said device to its rectilinear configuration, and a bending end position of said sleeve creating a bend angle D where; $D=2A\ \sin\ R/2$ between the axes of said two sleeves bringing the device its bent configuration, said pivot means allowing a free passage inside the string assembly at least for a drilling mud;

and wherein said column includes, beneath said bending device and above said tool, a member which rubs against the wall of the bore, said method comprising the steps:

continuously rotating said drilling string in a "normal" direction from the surface of the ground during rectinlinear drilling stages in order to maintain said slower sleeve in abutment against said alignment of said pivot sector; and effecting a change over from a rectilinear drilling stage to a curved drilling stage by temporarily rotating the drilling string in said opposite direction from the surface of the ground in order to bring the lower sleeve into abutment against said bending end of said pivot sector;

measuring the angular position of the bottom end of the drilling string about its axis and continuing to rotate said string in the opposite direction until said axis arrives in a predetermined plane of curvature in which a curved length of well is to be drilled;

performing said curved drilling stage without the string being rotated; and

effecting a changeover from a curved drilling stage to a rectilinear drilling stage by returning the rotation of the drilling string to rotation in the normal direction.

4,694,915

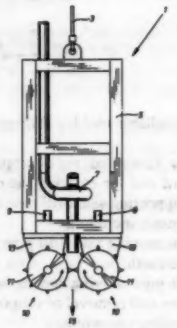
SLOTTED WALL MILLING CUTTER

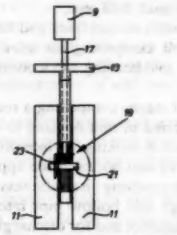
Karlheinz Bauer, Schrobenhausen, and Maximilian Arzberger, Igenhausen, both of Fed. Rep. of Germany, assignors to Karl Bauer Spezialtiefbau GmbH & Co KG, Schrobenhausen, Fed. Rep. of Germany

Filed Jun. 12, 1986, Ser. No. 849,449

Int. Cl.[4] E21B *4/16*

U.S. Cl. 175—91 **13 Claims**





1. A slotted wall milling cutter for producing a slotted wall in the ground, said slotted wall milling cutter comprising:

a cutter frame,

a bearing bracket fixed to said cutter frame,

two roller-like cutting wheels rotatably mounted on said bearing bracket, one of said two roller-like cutting wheels being located on each side of said bearing bracket,

at least one drive motor for rotating said two roller-like cutting wheels,

a cutting wheel gear arranged in said two roller-like cutting wheels to drive said two roller-like cutting wheels, and

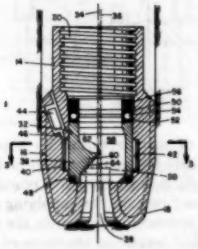
gear means including transmission means for interconnecting and transmitting a driving force between said at least one drive motor and said cutting wheel gear, said gear means being mounted within said bracket means to protect said gear means while the slotted milling cutter produces a slotted wall in the ground.

4,694,916

CONTINUOUS CORING DRILL BIT

George A. Ford, Houston, Tex., assignor to R. C. Ltd., Houston, Tex.

Filed Sep. 22, 1986, Ser. No. 910,389
Int. Cl.⁴ E21B *10/02*
U.S. Cl. 175—249 **13 Claims**



1. A continuous coring drill bit comprising:

(a) body means defining a vertical axis and adapted for connection to drill pipe and forming an internal body cavity disposed in eccentric relation with said vertical axis and a generally circular throat in communcation with said body cavity for conducting drilling fluid, said throat defining a throat axis coincident with said vertical axis and being of a configuration permitting passage of a formation core into said body cavity;

(b) a generally cylindrical tubular core breaker being rotatably mounted within said body cavity and defining a vertical axis of rotation of generally parallel and offset relation with said vertical axis of said body means; and

(c) a buttress element extending inwardly from said core breaker and adapted to contact said formation core, upon each rotation of said drill bit said buttress element applying transverse force to said core for fracturing of said core into sections sufficiently small for transport by said drilling fluid.

4,694,917

MECHANICAL JARRING DEVICES FOR USE IN DRILLING

Gerhard Heidemann, Witten-Stockum, and Johannes Witte, Brunswick, both of Fed. Rep. of Germany, assignors to Eastman Christensen Co., Salt Lake City, Utah

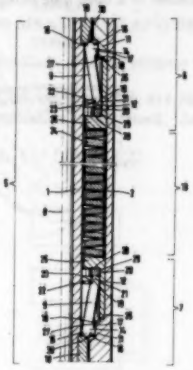
Filed Mar. 31, 1986, Ser. No. 846,585
Claims priority, application Fed. Rep. of Germany, Apr. 12, 1985, 3513123
Int. Cl.⁴ E21B *4/06, 31/107*
U.S. Cl. 175—299 **11 Claims**

1. In a jarring device for use in drilling which jar device comprises first and second members longitudinally relatively movable between a locked position and a released position the improvement which comprises:

providing control means including first and second locking devices arranged between and slidable relative to both said first and second members;

said first locking device having a release position and a locking position to prevent relative movement between said members until a predetermined force is applied to one of said movable members in one longitudinal direction;

said second locking device having a release position and a



locking position to prevent relative movement between said members until a predetermined force is applied to one of said movable members in the opposite longitudinal direction;

spring means longitudinally interposed between said first and second locking devices for normally maintaining said locking devices in said locking position, said predetermined force being sufficient to longitudinally displace one of said locking devices against the urging of said spring means out of said locking position and into said release position.

4,694,918

ROCK BIT WITH DIAMOND TIP INSERTS

David R. Hall, Provo, Utah, assignor to Smith International, Inc., Newport Beach, Calif.

Continuation-in-part of Ser. No. 728,177, Apr. 29, 1985, Pat. No. 4,604,106, which is a continuation-in-part of Ser. No. 600,399, Apr. 16, 1984, Pat. No. 4,525,178. This application Feb. 13, 1986, Ser. No. 829,022
The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.
Int. Cl.⁴ E21B *10/52*
U.S. Cl. 175—329 **54 Claims**

1. A percussion rock bit, comprising:

a steel body;

means at one end of the steel body for connecting the bit to a drill string;

a plurality of inserts embedded in the other end of the steel body, at least a portion of the inserts comprising:

a cemented tungsten carbide body having a grip portion embedded in the steel body and a converging end portion protruding from the surface of the steel body;

a polycrystalline diamond layer on the converging end of the carbide body;

at least one transition layer between the polycrystalline diamond layer and the carbide body, such a transition layer comprising a composite containing diamond crystals and precemented tungsten carbide particles, where the diamond crystal content is greater adjacent the

polycrystalline diamond layer and lower adjacent the cemented tungsten carbide body.

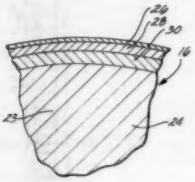
32. A rock bit comprising:

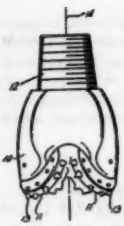
a steel body;

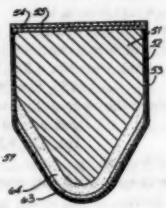
means at one end of the body for connecting the bit to a drill string;

means at the opposite end of the body for mounting at least one roller cone on the body for rotation around an axis transverse to the axis of the bit;

at least one roller cone so mounted on the body for rolling on the bottom of a bore hole being drilled;







a plurality of inserts in such a cone for crushing rock at the bottom of such a bore hole, at least a portion of such inserts comprising:

a cemented tungsten carbide body having a grip length embedded in the cone and a converging end portion protruding from the surface of the cone;

a polycrystalline diamond layer on the converging end of the carbide body; and

at least one transition layer between the polycrystalline diamond layer and the carbide body, the transition layer comprising a composite containing diamond crystals and precemented tungsten carbide particles.

4,694,919

ROTARY DRILL BITS WITH NOZZLE FORMER AND METHOD OF MANUFACTURING

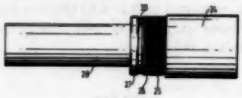
John D. Barr, Cheltenham, England, assignor to NL Petroleum Products Limited, Gloucestershire, England

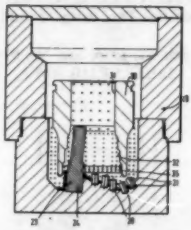
Filed Jan. 22, 1986, Ser. No. 821,303

Claims priority, application United Kingdom, Jan. 23, 1985, 8501702

Int. Cl.⁴ E21B *10/60*

U.S. Cl. 175—393 **9 Claims**





1. A method of manufacturing by a powder metallurgy process a rotary drill bit including a bit body having an external surface on which are mounted a plurality of cutting elements, and an inner passage for supplying drilling fluid to at least one nozzle located in a socket at the external surface of the bit, the method including the steps of forming a hollow mould for moulding at least a portion of the bit body, positioning on the interior surface of the mould at least one former which projects into the interior of the mould space at the desired location for a nozzle socket, the former having an external screw thread, packing around at least the externally threaded portion of the former a first matrix-forming material, packing around the former and first material a second matrix-forming material, the second matrix-forming material being a powdered material filling at least part of the mould, and infiltrating the matrix-forming materials with a metal alloy in a furnace to form a matrix, whereby the first matrix-forming material packed around the former becomes shaped with a corresponding internal screw thread, the former being so constructed that it may be removed from the bit body after formation thereof to leave in the matrix an internally threaded socket adapted to receive a separately formed, externally threaded nozzle, the internal threads in the socket being formed from the first matrix-forming material, the first matrix-forming material having characteristics enabling it to form an internal screw thread of the required fineness and the second outer matrix-forming material having different characteristics such as are normally required for a bit body.

4,694,920

COMBINATION WEIGHING SYSTEM AND METHOD

Kazufumi Naito, Ohtsu; Setsuo Haze, Shiga; Hideo Nobutugu, Kyoto; Yukio Nakagawa, Kyoto; Seiji Yamada, Kyoto, and Shuji Murata, Shiga, all of Japan, assignors to Ishida Scales Manufacturing Company, Ltd., Shiga, Japan

Filed Sep. 3, 1985, Ser. No. 772,244

Int. Cl.⁴ G01G *19/22, 19/52, 23/14*

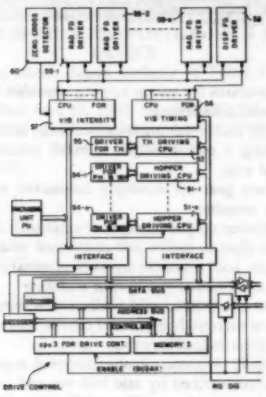
U.S. Cl. 177—25 **8 Claims**

1. An automatic combinational weighing system comprising a plurality of separate article batch handling means adapted to receive individual article batches, to measure weights of said received article batches, to output analog weight

signals indicative of said measured weights and to selectively discharge said measured article batches in response to a discharge signal, and

a control unit substantially consisting of a weight-monitoring section, a drive-control section and a main section,

said weight-monitoring section including means to input said analog weight signals from said article batch handling means and a weight-monitoring central processing unit (CPU) which serves to constantly read digital signals



corresponding to said analog weight signals and to detect stability of said article batch handling means by analyzing fluctuations in said weight signals,

said drive-control section including driving means for driving said article batch handling means and a drive-control CPU which serves to control said driving means, and

said main section including a main CPU for performing combinational calculations from said digital signals to select a combination of said article batch handling means.

4,694,921

SHEAR BEAM WEIGH AXLE TRANSDUCER

Bruce L. Johnston, Jefferson County, Wis., assignor to Butler Manufacturing Company, Kansas City, Mo.

Filed Oct. 20, 1986, Ser. No. 920,966

Int. Cl.[4] G01G *19/08, 3/14;* G01L *1/22*

U.S. Cl. 177—136 **12 Claims**

1. A shear beam transducer comprising:

a beam presenting opposite sides thereon, said beam being deflectable upon the application of loads thereto;

a pair of blind openings extending into the respective sides of said beam in alignment with one another, said openings terminating in end surfaces at blind ends of the openings and cooperating to provide the beam with a generally I-shaped cross sectional configuration having upper and lower flanges interconnected by a substantially vertical web presenting said end surfaces on opposite sides thereof;

each opening being undercut to present a relatively large cavity adjacent the blind end thereof and a smaller passage extending into the side of the beam;

a pair of strain gauges on each of said end surfaces, each strain gauge exhibiting a resistance which varies in proportion to the shear strain of said web; and

a bridge circuit having four arms and four corner terminals which define a pair of input terminals for receiving an input voltage and a pair of output terminals for providing an output voltage, said gauges being connected in the arms of the bridge circuit in a manner to provide an output voltage between said output terminals which is proportional to the shear strain of said web.

4,694,922

INSTRUMENT FOR MEASURING AND RECORDING FORCES

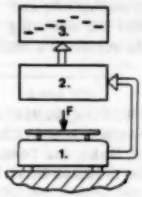
Guy Mairot, Vétraz-Monthoux, France, assignor to S.e.a.i.m.e., Annemasse, France

Filed Dec. 27, 1985, Ser. No. 814,200

Claims priority, application Switzerland, Jan. 17, 1985, 244/85

Int. Cl.[4] G01G *23/32*

U.S. Cl. 177—178 **4 Claims**



1. An instrument for measuring, registering and displaying forces, comprising

force measuring means, a transducer for converting measured forces into electric signals, calculating means controlled by said transducer, a plurality of memories for registering successive values of the measured forces, graphic display means,

said calculating means comprises an arrangement for calculating mean values of the measured forces within successive periods of time of different periodicities, the memories being provided for registering several series of successive values of force as a function of time, at least one of said series being formed by successive daily measured values of force, remaining series being formed each of successive mean values of measured forces calculated by said calculating means for a predetermined periodicity, controlling means being provided for actuating said display means for selectively displaying memorized values of forces of the n last measured values of the measured forces, and of the n last mean values of force calculated by said calculating means for each of said various periodicities.

4,694,923

HEAVY DUTY DISPLAY CART

Lawrence B. Grenzicki, 24780 Adlai, East Detroit, Mich. 48021

Filed Oct. 17, 1986, Ser. No. 920,244

Int. Cl.[4] B62D *1/28*

U.S. Cl. 180—6.5 **13 Claims**

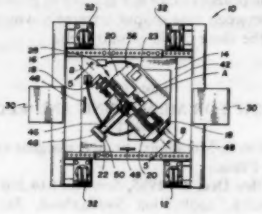
1. A heavy duty display cart comprising:

a carriage for supporting an object to be displayed, such as a vehicle;

a reversible drive mechanism supported below the carriage for rotation with respect thereto about a vertical axis, said drive mechanism including a pair of drive wheels and a pair of reversible drive motors respectively coupled to the pair of drive wheels to provide rotation of the drive mechanism about the vertical axis or movement of the cart;

a magnetic latch mechanism on the carriage and drive mech-

anism for fixing the rotational location of the drive mechanism with respect to the carriage in first second, third, and fourth positions spaced at 45 degree intervals about the vertical axis to thereby provide ten directions of movement of the cart upon reverse driving of the drive mechanism;



a radio receiver for operating the drive mechanism and the magnetic latch mechanism; and

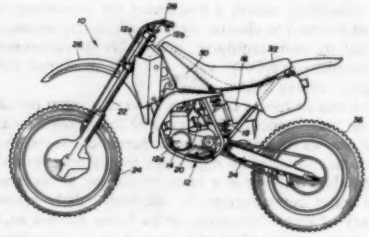
a radio transmitter for operating the receiver to control operation of the cart from a remote location.

4,694,924

MOTORCYCLE

Toshimitsu Asakura, Wako, and Tomoyuki Tagami, Soka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Dec. 24, 1985, Ser. No. 813,254
Int. Cl.[4] B62K 5/04
U.S. Cl. 180—68.3 **11 Claims**



1. A motorcycle comprising:

(a) an elongated frame having front and rear ends;

(b) an engine mounted on said frame;

(c) a fuel tank mounted on said frame above said engine and having an upper surface extending along a length of the frame;

(d) an elongated seat mounted on said frame above said fuel tank along the length of said frame, said seat having a bottom having a portion extending along the length thereof and disposed in spaced opposed relation to said upper surface of said fuel tank to define an air intake passageway therebetween, said passageway having an open front end opening toward the front end of said frame and having a rear open end, said seat having a front end disposed near to a front end of said fuel tank so that said seat covers said upper surface of said fuel tank generally entirely; and

(e) an air cleaner operatively connected to said engine and disposed rearwardly of said fuel tank, the rear open end of said passgeway being in communication with said air cleaner whereby the ambient air can be fed to said air cleaner through said air intake passageway.

4,694,925

STEERING APPARATUS

Maurice P. Roberts, Lafayette, Ind., assignor to TRW Inc., Lyndhurst, Ohio

Filed May 30, 1986, Ser. No. 868,602
Int. Cl.[4] B62D 5/04
U.S. Cl. 180—79.1 **12 Claims**

1. An apparatus for use in turning steerable vehicle wheels, said apparatus comprising:

an electric motor having a central axis, said electric motor including a motor output member rotatable about said central axis;

a planetary gear set drivingly connected with said motor output member;

a transmission output member coaxial with said central axis of said electric motor and connected with said planetary gear set and rotatable by said planetary gear set upon rotation of said motor output member;

a ball nut attached to said transmission output member for rotation therewith about said central axis upon rotation of said motor output member;

an externally threaded member disposed in engagement with and circumscribed by said ball nut and coaxial with said central axis and movable axially by said ball nut upon rotation of said motor output member for effecting turning of the steerable vehicle wheels; and

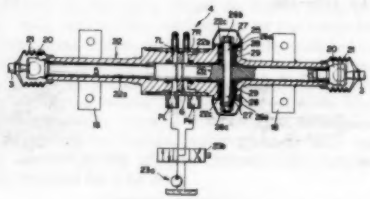
a manually rotatable drive shaft extending axially through said electric motor and said planetary gear set, said drive shaft having an input end portion drivingly connected with the steering wheel and an output end portion drivingly connected with said transmission output member.

4,694,926

VEHICLE STEERING SYSTEM

Masatoshi Kikkawa, Zama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Sep. 5, 1986, Ser. No. 903,966
Claims priority, application Japan, Sep. 6, 1985, 60-197173
Int. Cl.[4] B62D 5/10
U.S. Cl. 180—132 **7 Claims**



1. A hydraulic actuator for a vehicle steering system, comprising:

a housing having a cylinder;

a piston positioned to move in said cylinder and define on the opposite sides thereof a pair of hydraulic chambers for selective communication with a source of hydraulic fluid under pressure;

an actuator rod connected to said piston to move together therewith and extending externally of said housing; and

biasing means for holding said actuator rod in a predetermined position when hydraulic fluid pressures in said chambers are substantially equal to each other;

said biasing means including a cylindrical pushing pin secured to one of said actuator rod and said housing and an annular resilient bushing surrounding a longitudinal portion of said pin and secured to the other of said actuator rod and said housing in such a manner that displacement of said actuator rod out of said predetermined position causes said pushing pin to compress a longitudinally separated half of said bushing while stretching the remaining longitudinally separated half of said bushing.

4,694,927

VEHICULAR SPEED RESPONSIVE POWER STEERING DEVICE

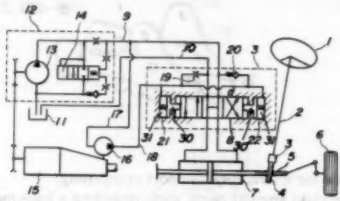
Kiyoshi Nagae, Aichi, Japan, assignor to Tokai TRW & Co., Ltd., Aichi, Japan

Filed Apr. 16, 1986, Ser. No. 852,795

Claims priority, application Japan, Apr. 19, 1985, 60/84344

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—132 **2 Claims**



1. A power assisted steering apparatus for a vehicle comprising:

an actuator for providing power assist;

a main pump for supplying fluid flow to said actuator;

control valve means for controlling fluid flow from said main pump to said actuator;

first passage means for communicating fluid flow from said main pump to said control valve; and

means for varying the power assist in accordance with a vehicle speed, said means comprising a vehicle speed responsive pump having an inlet port and an outlet port, second passage means for connecting said inlet port of said vehicle speed responsive pump with said first passage means, third passage means for connecting said outlet port of said vehicle speed responsive pump with a reservoir, a reactive pressure orifice located in said third passage means, and a reactive pressure check valve which is located between said third and first passage means, opens in response to a fluid pressure to direct flow from the third passage means to the first passage means, and communicates with said third passage upstream of said reactive pressure orifice.

4,694,928

OPERATOR RESTRAINT SYSTEM

James C. Barton, Peoria; Robert E. Hefner, Morton, both of Ill.; Paul A. Reid, Mentor, and Frank R. Sable, Wickliffe, both of Ohio, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Jun. 9, 1986, Ser. No. 872,346

Int. Cl.[4] B60R *21/10*

U.S. Cl. 180—268 **23 Claims**

1. A work vehicle comprising:

first and second spaced apart vehicle sides;

an operator station having a seat, said seat having first and second spaced apart side portions and being mounted on said operator station;

a lap belt having first and second spaced apart end portions;

means for connecting said lap belt first end portion to said operator station at a first location adjacent the seat first side;

means for connecting the lap belt second end portion to said operator station at a second location adjacent the seat, second side; and

means for automatically releasing one of the first and second lap belt end portions from connection with said operator's station in response to and simultaneously with a vehicle side over turn generated impact being applied to one of

the first and second vehicle sides in a direction transverse to one of the first and second seat side portions, said automatic releasing means being maintained from releasing said one of the first and second end portions in response to an impact with the vehicle in directions longitudinal of the first and second sides and being free from external contact.

4,694,929

FRAME BODY OF MOTORCYCLES

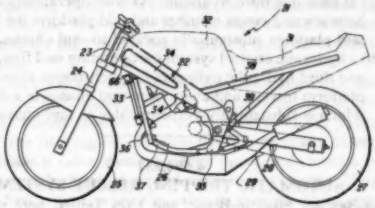
Makoto Sugimoto, Iwata, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Japan

Filed Jan. 17, 1986, Ser. No. 820,546

Claims priority, application Japan, Jan. 18, 1985, 60-6746; Mar. 14, 1985, 60-51097

Int. Cl.[4] B62K *11/04*

U.S. Cl. 180—311 **13 Claims**



1. A frame construction for a vehicle having only a single dirigible front wheel comprising a head pipe adapted to dirigibly support said front wheel and a main frame member affixed at its forward end to said head pipe and extending rearwardly therefrom, said main frame member comprising a box section member, made up of a pair of generally C-shaped pieces having overlapping flanges affixed to each other, said C-shaped pieces tapering in height from said head pipe to the rear in a decreasing manner.

4,694,930

LIFTING APPARATUS

Mitsuihiro Kishi, Ashikaga, Japan, assignor to Kabushiki Kaisha Hikoma Seisakusho, Tochigi, Japan

Filed Apr. 1, 1986, Ser. No. 846,813

Claims priority, application Japan, Apr. 3, 1985, 60-70459; Apr. 13, 1985, 60-79041; Jun. 11, 1985, 60-126830; Jun. 17, 1985, 60-132593

Int. Cl.[4] B66F *11/04*

U.S. Cl. 182—2 **11 Claims**

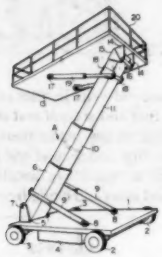
1. A lifting apparatus comprising:

(a) a chassis;

(b) a platform;

(c) a telescopic boom assembly connecting said chassis and said platform together, said telescopic boom assembly being composed of a plurality of telescopically movable booms which are axially aligned with each other;

(d) a cover member mounted on an upper one of said booms closest to said platform and having an end extending towards one of said booms other than said upper boom closest to said platform, said cover member overlying said upper boom closest to said platform and said booms other than said upper boom, said cover member being engageable with an upper surface of each of said booms other than said upper boom when said telescopic boom assembly is expanded and contracted;



(e) at least one first hydraulic cylinder disposed in said telescopic boom assembly for extending and contracting said telescopic boom assembly;

(f) at least one second hydraulic cylinder operatively coupled between said telescopic boom assembly and said chassis for tilting said telescopic boom assembly with respect to said chassis;

(g) at least one third hydraulic cylinder operatively coupled between said cover member and said platform for keeping said platform substantially parallel to said chassis; and

(h) a hydraulic control system for operating said first, second and third hydraulic cylinders in synchronism to move said platform toward and away from said chassis in a direction which is substantially perpendicular to said chassis.

4,694,931

AUTOMATIC TRIPPING RESCUE SYSTEM

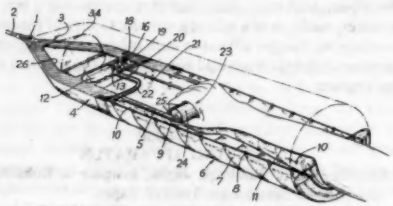
Jean-Baptiste Sibertin-Blanc, and Yves Tellier, both of Paris, France, assignors to Ecole Nationale Superieure de Creation Industrielle, Paris, France

Filed Oct. 10, 1986, Ser. No. 917,496

Claims priority, application France, Oct. 11, 1985, 85 15142

Int. Cl.[4] A62B *35/00*

U.S. Cl. 182—3 **5 Claims**



1. An automatic rescue system of the type comprising a physical, generally supple, link (2), said link being controlled at one of its extremities by a rescuer, the other extremity of said link being linked to a fastening system able to be made integral with a rescued person, characterized in that said fastening system is comprised of a mobile and inflatable sleeve (6), in that said system is fitted with a visible and easily sizable manual prehension element (23), said element being provided with tripping means (25) which are actuated by a mere hand grasping of this tripping element (25) and intended to firstly automatically and rapidly displace the sleeve (6) to place it around the forearm of the rescued person, and secondly to inflate said sleeve (6) to enclose the wrist and the forearm of the rescued person under a non-traumatising pressure.

4,694,932

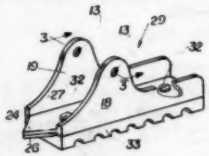
STRUCTURAL SUPPORT SHOE AND METHOD OF MANUFACTURING THE SAME

Thomas J. Schmitt, Louisville, Ky., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Aug. 12, 1986, Ser. No. 895,696

Int. Cl.[4] E06C *7/46*

U.S. Cl. 182—109 **13 Claims**



1. A shoe for a structural support comprising:

a pair of rigid angular parts, each including a base member and a side member extending integrally therefrom at an angle thereto;

the base member of one part being positioned in cooperative relation with respect to the base member of the other part with the side members of each part extending in opposed facing spaced relation to each other; and,

means to join said base members in fast reinforcing relation to form said shoe.

4,694,933

SELF-PROPELLED SCAFFOLD FOR BUILDINGS AND ROPE TENSIONING MEANS, AS WELL AS PROCESS FOR THE CONSTRUCTION AND/OR FOR THE SERVICING OF HIGH BUILDINGS

Tibor Sinkó, Budapest, Hungary, assignor to Kisuzemi Innovacios Iroda, Budapest, Hungary

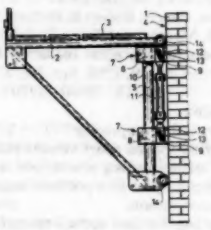
PCT No. PCT/HU84/00027, § 371 Date Dec. 18, 1984, § 102(e) Date Dec. 18, 1984, PCT Pub. No. WO84/04127, PCT Pub. Date Oct. 25, 1984

PCT Filed Apr. 19, 1984, Ser. No. 690,499

Claims priority, application Hungary, Apr. 19, 1983, 1343/83; Apr. 19, 1983, 1344/83

Int. Cl.[4] E04G *3/10*

U.S. Cl. 182—128 **17 Claims**



1. In a self-propelled scaffold for buildings exhibiting a continuous outline, wherein the scaffold comprises a framework

having a vertical beam, a working platform formed on a horizontal bracket of the framework and tensionable elements extended around the building and providing a detachable connection between the building and the framework; the improvement in which, at each of at least two levels of height, the framework is associated with at least one set of jaws, through which the tensionable elements are passed for holding them away from an outer surface of the building and each set of jaws is connected respectively with a mutually independent, detachable connection to the outer surface of the building, one set of said jaws being fixedly attached to the to said beam and another set of said jaws having a sleeve which slidingly accomodates the beam and being joined to said one set of jaws by a length-variable element.

4,694,934

PORTABLE ELEVATING DEVICE

Curtis W. Erickson, Rte. 6, Box 202, Buffalo, Minn. 55313

Filed Dec. 20, 1983, Ser. No. 563,688
Int. Cl.[4] E04G *3/10*
U.S. Cl. 182—142 **10 Claims**

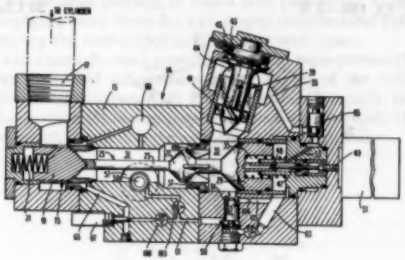
1. In a portable elevating device including a member for releasably grabbing a pole, a tree, or the like at an elevated vertical position, a telescoping pole for removeable interconnection to the releasably grabbing member for positioning the releasably grabbing member at the elevated vertical position, a winch for rolling and unrolling a length of cable thereon, with the free end of the cable being secured to the releasably grabbing member; a winch frame, with the winch being mounted to the winch frame, and a member secured to the winch frame for supporting an operator, with the improvement comprising an improved releasably grabbing member comprising, in combination: a generally C-shaped member including: a first member having a first end and a second end; a second member having a first end and a second end; with the first end of the second member being interconnected to the second end of the first member at an angle equal to 90 degrees; a third member having a first end and a second end, with the first end of the third member being interconnected to the second end of the second member at an angle equal to 135 degrees; a fourth member having a first end and a second end, with the first end of the fourth member being interconnected to the second end of the third member at an angle equal to 90 degrees, wherein said fourth member extends upward from the plane of the second member and the third member at an angle equal to 25 degrees, with the C-shaped member being positionable around the pole, tree, or the like by passing the pole, tree, or the like between the opening of the C-shaped member defined by the first end of the first member and the second end of the fourth member with the first member and the third and fourth members abutting with the outside surface of the pole, tree, or the like for releasably gripping the pole, tree, or the like within the C-shaped member.

4,694,935

SELF-ADJUSTING CONTROL VALVE FOR ELEVATORS

William A. P. Lawrence, Simi Valley, Calif., assignor to Cemco, Inc., Plumsteadville, Pa.

Filed Oct. 17, 1986, Ser. No. 920,213
Int. Cl.[4] B66B *1/04*; F15B *13/043*
U.S. Cl. 187—111 **26 Claims**



1. A self-adjusting control valve for a hydraulically-operated elevator propulsion system, the system having a cylinder within which a piston is moved by the pressure of a hydraulic medium, the valve comprising:

(a) means defining a housing, the housing defining an interior chamber,

(b) means for fluidly connecting the cylinder to the chamber,

(c) a bypass piston assembly, the bypass piston assembly comprising means for dividing the chamber into three regions, the first region being nearest to the connecting means, the third region being farthest from the connecting means,

(d) a check valve, positioned between the connecting means and the first region, wherein the opening of the check valve means enables fluid to flow between the cylinder and the first region, wherein the bypass piston assembly includes a valve element which opens and closes a path between the first and second regions, wherein the filling of the first region, when the valve element is closed, causes sufficient pressure buildup in the first region to cause the check valve means to open and to force hydraulic fluid into the cylinder,

(e) means for directing hydraulic fluid from a reservoir into the first region, and a pilot line for directing fluid from the reservoir into the third region,

(f) means for conveying hydraulic fluid out of the second and third regions, and back to the reservoir,

(g) means for measuring the rate of flow of fluid out of the second region,

(h) means for measuring the pressures in the first region and in the cylinder,

(i) needle valve means for varying the rate of fluid flow out of the third region, the needle valve means being capable of being moved by a motor means,

(j) means for monitoring the linear position of the needle valve means,

(k) a microprocessor, the microprocessor being connected to receive inputs from the flow measuring means, the pressure measuring means, and the monitoring means, the microprocessor being programmed to control the motor means, so as to move the needle valve means, wherein movement of the needle valve means changes the pressure difference between the first and third regions, whereby movement of the needle valve means causes movement of the bypass piston assembly, and

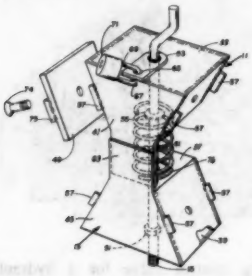
(l) a solenoid valve, fluidly connected to the cylinder, and fluidly connected to the third region, the solenoid valve, when actuated, completing a path for fluid out of the cylinder and into the reservoir, the solenoid valve being connected for actuation by the microprocessor, whereby the elevator can be lowered by allowing fluid to exit the cylinder.

4,694,936

EXTERIOR BRAKE FOR TANDEM TIRES

Carl E. Jackson, 1019 6th St., Perry, Okla. 73077

Filed Feb. 28, 1986, Ser. No. 834,575
Int. Cl.[4] B60T *1/04*
U.S. Cl. 188—2 R **20 Claims**



1. An exterior brake device for braking tires against movement on a vehicle having a pair of tires which are radially closely spaced, said brake device comprising:

upper and lower opposing wedges which are sized for wedging engagement with upper and lower, respectively, tread surfaces of said spaced tires for preventing rotation of the tires;

a threaded bar joining said upper and lower wedges and connected thereto so that rotation of the bar moves the wedges toward and away from each other;

handle means connected to said bar for rotating said bar for moving said wedges toward and away from each other;

lock means for locking said bar against rotation; and

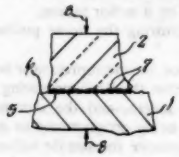
expansion pads adapted to be removably connected to said upper and lower wedges for changing the size of said wedges to fit different tire configurations and for engaging tread surfaces of said different tire configurations.

4,694,937

FRICTION ELEMENTS, ESPECIALLY FOR DRUM BRAKES

Siegfried Jonas, Gummersbach, Fed. Rep. of Germany, assignor to Beral Bremsbelag GmbH, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,395
Claims priority, application Fed. Rep. of Germany, Mar. 7, 1985, 3508109
Int. Cl.[4] F16D *69/00*
U.S. Cl. 188—73.1 **11 Claims**



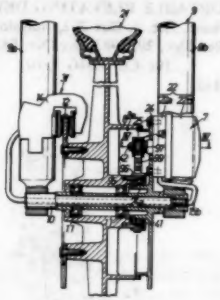
1. A friction element comprising a lining carrier and a friction lining rivated thereon, wherein between the mating surfaces of the friction lining and the lining carrier a multiplicity of particles are provided which particles are harder than the surface of the lining carrier, said particles being adhered to only one of said mating surfaces by means of a binder.

4,694,938

BRAKING DEVICE FOR VEHICLE

Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1985, Ser. No. 738,675
Claims priority, application Japan, May 30, 1984, 59-109835
Int. Cl.[4] B60T *8/34*
U.S. Cl. 188—181 A **8 Claims**



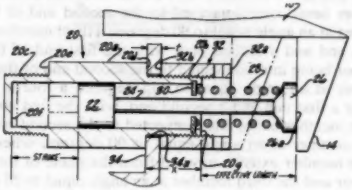
1. A braking device for motorcycles, comprising: a brake actuated by hydraulic pressure from a master cylinder for applying brake power to a motorcycle wheel; and an antilock control unit having an inertia type wheel angular deceleration sensor bulit therein which is driven by said wheel, said antilock control unit controlling a brake hydraulic pressure for said brake in accordance with an output of said sensor, wherein said brake and said antilock control unit are disposed in such a manner that they are located opposite each other on right and left sides of said wheel, and wherein a hydraulic conduit is provided to extend between said antilock control unit and said brake for feeding said brake hydraulic pressure having been controlled by said antilock control unit to said brake, said hydraulic conduit penetrating through a hollow portion formed inside an axle of said wheel.

4,694,939

SHOCK ABSORBER WITH STOP COLLAR

Robert J. Heideman, Westland, and Richard T. Mitera, Canton, both of Mich., assignors to Enertrols, Inc., Westland, Mich.

Filed May 3, 1985, Ser. No. 730,334
Int. Cl.[4] F16F *9/48*
U.S. Cl. 188—287 **17 Claims**



1. An elongated shock absorber comprising:

(A) a main body portion;
(B) a reduced diameter front end portion forming an annular shoulder with said main body portion;
(C) a piston assembly including a piston slideably mounted in said shock absorber for axial movement between a rest position and a working position proximate but spaced from the rear end wall of said shock absorber, a piston rod secured to said piston and extending axially forwardly out of the front end of said reduced diameter portion, and an impact pad on the front end of said piston rod;
(D) an elongated annular stop collar sized to fit telescopically over said reduced diameter portion; and
(E) means mounting said collar telescopically over said reduced diameter portion in a predetermined position relative to said shoulder, with the front annular end of said collar spaced forwardly from the front end of said reduced diameter portion and the rear annular end of said collar proximate said shoulder, and operative in response to an object impacting said pad and striking the free annular end of said collar to transmit the impact loading at the rear annular edge of said collar in a straight axial line into said shoulder for absorption by said main body portion.

17. A method of mounting a shock absorber in a manner to simultaneously secure the shock absorber to a support structure, prevent bottoming of the piston of the shock absorber against the rear end wall of the shock absorber, and provide a precise predetermined end limit position for an object impacting the impact pad secured to the free end of the piston rod of the shock absorber, said method comprising the steps of:
(A) forming a threaded reduced diameter portion at the front end of the shock absorber forming an annular shoulder with the main body portion of the shock absorber;
(B) providing a bracket of predetermined thickness and having an aperture having a diameter larger than the diameter of said reduced diameter portion and smaller than the diameter of said body portion;
(C) securing said bracket to the support structure;
(D) passing said reduced diameter portion through said aperture to position the rear face of said bracket against said shoulder;
(E) providing an annular internally threaded stop collar of circular cross-section adapted to be threaded onto said reduced diameter portion and having a predetermined length slightly greater than the length of said reduced diameter portion plus the rest distance, or effective length, from the impact surface of said impact pad to the front end of said reduced diameter portion minus said predetermined bracket thickness and minus the rest distance, or stroke, of said piston from said rear end wall; and
(F) threading said collar onto said reduced diameter portion and into abutting engagement at its rear annular edge with the front face of said bracket to rigidly mount said shock absorber on said bracket and simultaneously position the front annular edge of said collar forwardly of the front end of said reduced diameter portion by a precisely determined distance such that the impacting object will engage said front annular edge just prior to bottoming of said piston against said end wall and the impacting object will be stopped at its precise predetermined end limit position.

4,694,940

CARRYING CASE WITH A HINGED LID AND CLOSURE MEMBER

Yutaka Horiuchi, Apt. 910, 100-8th Avenue, Kitchener, Ontario, Canada N2C 1S3

Filed Mar. 6, 1986, Ser. No. 837,071
Int. Cl.[4] A45C 3/02, 13/10, 15/02
U.S. Cl. 190—109 **5 Claims**

1. A carrying case, which comprises a body (1) and a closure member (3);
where the body includes a well-shaped compartment (14) in the body;
characterized in that:
the closure member (3) includes a main-portion (7) and a flap-portion (8), the portions being connected by a connecting means (10) which permits relative movement therebetween;
the flap-portion (8) is smaller than the main-portion (7); the main-portion (7) is rigid;
and the closure member (3) can be set selectably to all these positions relative to the body:
(a) a closed position, in which the said two portions (7, 8) of the closure member (3) lie over respective parts of the well-shaped compartment (14), the closure member (3) being so shaped and dimensioned as to substantially close at least a major part of the well-shaped compartment (14) when set in the closed position;
(b) a wide-open position, in which both portions (7, 8) are displaced away from the well-shaped compartment (14), leaving the well-shaped compartment wide open;
(c) and a partially-open position where the main-portion (7) lies over, and substantially closes, a part of the well-shaped compartment (14), and where, simultaneously, the flap-portion (8) lies open enough relative to the body (1) to permit access into the wall-shaped compartment;

where the case is provided with a lid (2), where the lid is separate from the closure member (3), and where the lid is attached to a back wall (12) of the body (1) and is pivotable relative to the back wall (12);
where the lid (2) includes a lid-flap-portion (21) and a lid-main-portion (24) the portions (21, 24) being connected by a lid-flap-connecting-means (25) which permits relative movement therebetween;
where the lid (2) can be set selectably to all these positions relative to the body (1):
(a) a closed position, in which the said two portions (21,24) of the lid (2) lie over the corresponding portions (8,7) of the closure member (3);
(b) a wide-open position, in which both portions (21, 24) of the lid are displaced away from the closure member (3), leaving the closure member, in substance, wide open;
(c) and a partially-open position, where the lid-mainportion (24) lies over, and substantially closes, the main-portion (7) of the closure member (3), and where simultaneously the lid-flap-portion (21) lies open enough relative to the closure-member (3) to permit access into the lid-flap-portion (21).

4,694,941

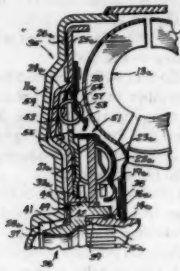
DRIVE HUB FOR TORQUE CONVERTER CLUTCH

David A. Hall, Clawson, and Kenneth C. Yuergens, Farmington Hills, both of Mich., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Jul. 16, 1986, Ser. No. 886,146
Int. Cl.[4] F16D 3/12
U.S. Cl. 192—3.28 **4 Claims**

1. A one-piece drive hub and spacer for a lock-up clutch in a torque converter, comprising an elongated hub barrel having a counterbored internal passage defining a shoulder acting to engage the end of a turbine hub of the torque converter having external splines; a plurality of internal splines in the counterbored portion adapted to receive the externally splined turbine

hub, a cylindrical external surface receiving the inner periphery of a clutch piston plate, sealing means in said external



surface engaging the plate periphery, and external splines formed adjacent one end of said surface adapted to receive a hub plate for said lock-up clutch.

4,694,942

INTERLINKING CONTROL DEVICE FOR BRAKE AND CLUTCH IN TRACTOR-MOUNTED WORKING MACHINES

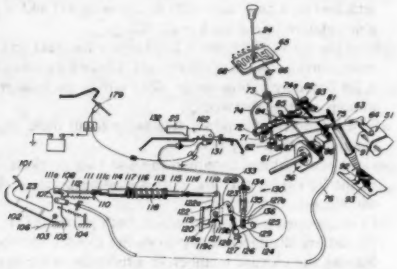
Takeo Ogano; Takeshi Komatsuzaki; Ryoichi Shigenari, all of Saitama, and Naomoto Uesugi, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Toyko, Japan

Filed Feb. 15, 1985, Ser. No. 702,208

Claims priority, application Japan, Feb. 17, 1984, 59-29210; Feb. 17, 1984, 59-29213

Int. Cl.[4] F16D *41/24;* **G05G** *9/08*

U.S. Cl. 192—13 A **4 Claims**



1. An interlinking control device in a tractor-mounted working machine having an engine with a governor, wheels, a braking mechanism for braking the wheels, and a clutch for selectively transmitting power from the engine to the wheels, said interlinking control device comprising:

(a) a first control system for operating said braking mechanism;

(b) a second control system for operating said clutch;

(c) a single manually operated swingable member coupled to ends of said first and second control systems, the arrangement being such that said clutch starts being disengaged when said swingable member starts swinging and is completely disengaged when said swingable member is positioned intermediately on a path of swinging movement thereof, and said braking mechinism produces a maximum braking force when said swingable member reaches a terminal end of said path of swinging movement thereof; and

(d) a third control system for operating said braking mechanism to produce a braking force slightly greater than a force required to stop the tractor-mounted working machine on a sloping surface lying at 20° wherein said first and second control systems include first and second wire members respectively, said swingable member having an arcuate slot defined therein about a pivot thereof, the first wire member having an end engaging in said arcuate slot for movement therealong, including a resilient member connected between said swingable member and said first wire member for normally urging said first wire member toward said swingable member.

4,694,943

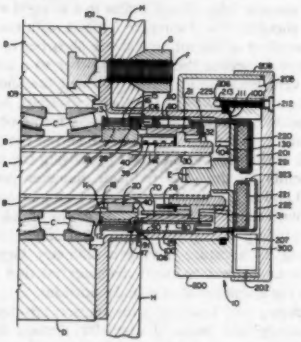
GROUND CLUTCH ASSEMBLY WITH DYNAMIC ENGAGEMENT AND DISENGAGEMENT

Harry A. Petrak, Boulder, Colo., assignor to Boulder 12 Investments, Boulder, Colo.

Filed Jan. 21, 1986, Ser. No. 820,731

Int. Cl.[4] B60B *27/00;* **B60K** *23/08;* **F16D** *1/06, 43/20*

U.S. Cl. 192—35 **25 Claims**



1. A clutch assembly for converting a vehicle between two-wheel drive and four-wheel drive by effecting dynamic engagement and disengagement between a drive shaft and a ground engaging wheel to be driven and wherein torque applying means are provided to selectively and positively rotate the drive shaft, said clutch assembly comprising;

a fixed locking member;

a receiver gear drivingly connected to said wheel to be driven;

a drive gear keyed for rotation with said drive shaft and being axially movable with respect to said drive shaft, said drive gear interposed between said fixed locking member and the wheel to be driven and cam follower means associated with said drive gear;

an axially movable camming assembly provided with a cam surface, said cam follower means along with cam surface to impart axial movement to said drive gear along said drive shaft when said camming assembly is fixed against rotation and said drive gear is being rotated by said drive shaft; and

shift means movable into engagement with said fixed locking member whereby to temporarily lock said camming assembly against rotation, said cam follower means being responsive to positive rotation of said drive shaft when said camming assembly is locked against rotation by said fixed locking member to advance between first and second portions of said cam surface whereby said drive gear is advanced in an axial direction into and out of engagement with said receiving gear and said shift means and camming assembly are released from locking engagement with said fixed locking member so that said shift means and camming assembly are thereafter rotatable with said drive gear, and activating means for moving said shift means into engagement with said locking member independently

of the application of torque to said drive shaft or the rotation of said wheel to be driven.

4,694,944

OVERLOAD CLUTCH PARTICULARLY FOR THREAD-CUTTING CHUCKS OR THE LIKE

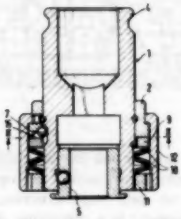
Wolfgang Schmidt, Lauf, Fed. Rep. of Germany, assignor to Emuge-Werk Richard Glimpel Fabrik fuer Praezisionswerkzeuge (vormals Moschkau & Glimpel), Lauf, Fed. Rep. of Germany

Filed Sep. 11, 1985, Ser. No. 774,832

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1984, 3437269

Int. Cl.[4] F16D *43/20, 7/06*

U.S. Cl. 192—56 R **19 Claims**



1. A safety overload clutch operable between an engaged and disengaged position comprising a drive member and a driven member, each of said members having at least a partial cylindrical configuration with one of said members being coaxially disposed relative to the other of said members, ball pockets provided in said one member, clutch balls receivable in said ball pockets when the clutch is in said engaged position, said ball pockets having a depth less than the diameter of said clutch balls, said ball pockets defining grooves extending longitudinally parallel to the axis of said members, said clutch balls being displaced from said ball pockets when the clutch is in said disengaged position, an inclined ramp means in the other of said members receiving said clutch balls when the clutch passes from said engaged to said disengaged position, said inclined ramp means being inclined at an angle other than a right angle relative to the axes of said members such that said clutch ball moves radially and axially along said inclined ramp means when passing between said engaged and desengaged positions, a pressure ring carried by said other member, biasing means between said pressure ring and said other member biasing pressure ring in an axial direction, said pressure ring engaging said clutch balls such that said biased pressure ring urges said clutch balls into said engaged position, and a release channel in said other member opening up to said inclined ramp means that upon a torque overload condition, said balls overcome the bias of said pressure ring and pass in both a radial and axial direction from said ball pockets along said inclined ramp means into said release channel, said release channel having a cross-sectional configuration which precludes said clutch balls from being subjected to the application of a radial biasing force induced by said biasing means when said clutch balls are in said release channel.

4,694,945

ELECTROMAGNETIC CLUTCH WITH AN IMPROVED MAGNETIC ROTATABLE MEMBER

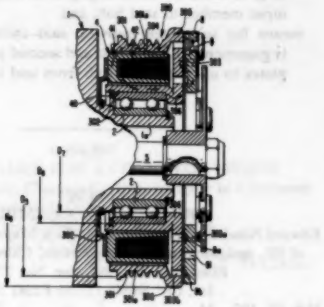
Takatoshi Koitabashi, Annaka, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Oct. 16, 1984, Ser. No. 661,465

Int. Cl.[4] F16D *27/10*

U.S. Cl. 192—84 C **2 Claims**

1. An electromagnetic clutch including a first rotatable member of magnetic material rotatably supported on a bearing, an annular electromagnetic device disposed in a stationary position in a hollow portion of said first rotatable member, said annular electromagnetic device including an annular magnetic housing, an annular magnetic coil disposed therein, a second rotatable member, a hub secured on said second rotatable member, a magnetic armature plate supported on and around said hub at a predetermined radial gap, said magnetic armature plate being capable of limited axial movement and facing said first rotatable member at a predetermined axial air gap, said magnetic armature plate further being attracted to said first



rotatable member when said annular magnetic coil is energized, the improvement comprising said first rotatable member comprising an outer cylindrical member, an inner cylindrical member and an axial end plate member which has an axial end surface connecting said outer and inner cylindrical members, wherein the outer diameter of said axial end plate member is larger than the diameter of any part of the outer cylindrical member and the inner diameter of said axial end plate member is smaller than the diameter of any part of the inner cylindrical member.

4,694,946

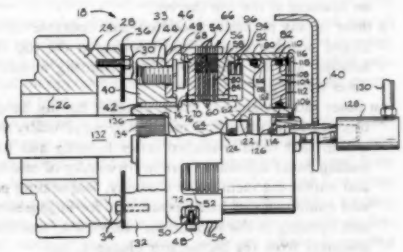
CLUTCH ASSEMBLY FOR A DIESEL ENGINE BLOWER

Dean A. Pearch, Mt. Pleasant, and Thomas F. Pung, Weidman, both of Mich., assignors to Dana Corporation, Toledo, Ohio

Filed Sep. 19, 1985, Ser. No. 777,713

Int. Cl.[4] F16D *25/00*

U.S. Cl. 192—85 AA **14 Claims**



1. A clutch assembly comprising:

a generally hollow cylindrical driven input member having a co-axial passageway formed therethrough;

a first plurality of radially inwardly extending clutch plates connected to said input member for rotation therewith;

a second plurality of radially outwardly extending clutch plates interleaved with said first plurality of clutch plates;

a rotatable hub connected to said second plurality of clutch plates for rotation therewith, said hub including an annular piston plate disposed thereabout which is axially im-

movable relative thereto, said hub forming an output member to said clutch assembly;

a hollow cylinder disposed about said hub and said piston plate and axially movable relative to said hub, said cylinder including a radially inwardly extending cylinder plate disposed between said first and second pluralities of clutch plates and said piston plate;

means for normally urging said cylinder plate into engagement with said first and second pluralities of clutch plates so as to cause frictional engagement thereof to couple said input member to said hub; and

means for selectively moving said cylinder plate out of engagement with said first and second pluralities of clutch plates to uncouple said hub from said input member.

4,694,947

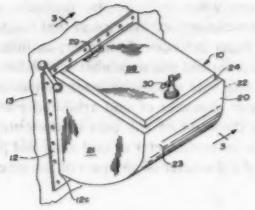
DUMP CHUTE ASSEMBLY

Edward Nineberg, Evanston, and Mark Menaker, Chicago, both of Ill., assignors to ML Corporation, Chicago, Ill.

Filed Sep. 23, 1985, Ser. No. 778,798

Int. Cl.[4] B65G *11/20*; F23G *5/00*

U.S. Cl. 193—34 **14 Claims**



1. In an incinerator chimney having an opening therein for permitting refuse to be deposited therein, including in combination, a dump chute assembly comprising

a housing enclosure mounted to the incinerator chimney about the opening in the incinerator chimney,

a radially-shaped outer housing mounted to said housing enclosure and extending outwardly therefrom and having an opening at the top thereof,

a door means pivotally mounted and operable between a closed position closing said opening at the top of outer housing and an open position permitting access to the outer housing,

an inner radially-shaped chute member having an opening therethrough, said chute member being pivotally mounted within said radially-shaped outer housing and having a sealing panel mounted thereon forwardly of said opening and within the incinerator chimney, said sealing panel on said chute member being positioned for engagement with said opening in the incinerator chimney to seal the chute assembly from the incinerator chimney, and

control means operatively connected to said inner radially-shaped chute member to pivotally move the same and said sealing panel thereon from a closed sealing position, wherein said outer housing prevents the flow of material through said opening in said inner chute member, to a dumping position wherein said sealing panel is moved to an open position away from the opening in the incinerator chimney and said opening in said inner chute member is positioned in the chimney and the material in said inner radially chute member is deposited into the incinerator chimney.

4,694,948

TRAVELLING HOPPER BELT CAR

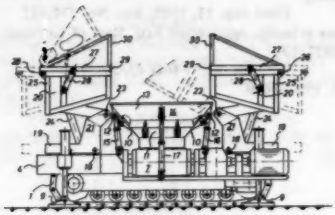
Sükrü Ceylan, Lubeck, Fed. Rep. of Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 802,520

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3443684

Int. Cl.[4] B65G *41/00*

U.S. Cl. 198—311 **13 Claims**



1. A travelling hopper belt car comprising a superstructure, a belt carrier mounted for pivoting in a vertical plane around a horizontal axis on said superstructure, a throw-off belt mounted for movement in a conveying direction on said belt carrier, a feed chute connected to said belt carrier adjacent said horizontal axis, said feed chute having side walls which each include a lower section fixed to said carrier and an upper side section pivotally mounted to each lower section respectively about a further horizontal axis for folding down at least to a vertical height of said further horizontal axis, said travelling superstructure being mounted for pivoting in a horizontal plane about a vertical axis, a support arm mounted on said superstructure and carrying said horizontal axis of said belt carrier, said support arm extending to a feed end of said throw-off belt under said feed chute, a feed device mounted on said superstructure at opposite sides of said feed chutes, and feed device mounting means for moving said feed device on each side of said feed chute toward and away from said feed chute in a horizontal direction, each feed device comprising a feed trough for receiving material and a bearing connected to each feed trough for pivoting each feed trough about at least one axis which is on one side of said feed end of said throw-off belt and extends in the conveying direction of said throw-off belt.

4,694,949

ARTICLE SELECTING SYSTEM

Osamu Nakagawa, Nagaokakyo, Japan, assignor to Murata Kikai Kabushiki Kaisha, Japan

Filed May 29, 1985, Ser. No. 738,943

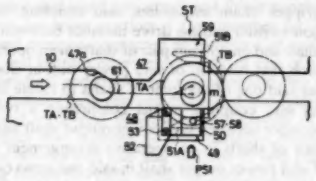
Claims priority, application Japan, May 29, 1984, 59-108758

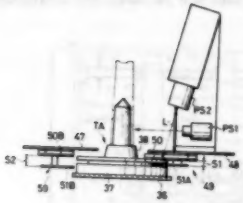
Int. Cl.[4] B65G *47/22*; B65H *67/06*

U.S. Cl. 198—351 **5 Claims**

1. An article selecting system comprising a branch path and a gauge plate provided intermediately of a transport path which transports n-types ($n \geqq 3$) of different articles for sorting articles of the n-types into two types of articles and $n-2$ types of articles, a second gauge plate located at a particular position on a transport path for the sorted two types of articles for displacing the articles to two positions in accordance with the

two types, an article arrival detecting sensor and an article presence detecting sensor indicating whether a specific article





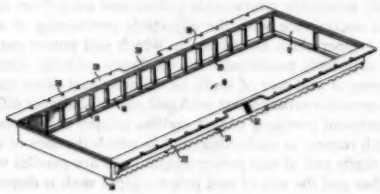
type is present on said transport path for the sorted two types of articles.

4,694,950

TAPE CASSETTE ASSEMBLY TRAY

Robert B. Macleod, Jr., Kennebunkport, Me., assignor to Shape Inc., Me.

Filed Sep. 25, 1984, Ser. No. 654,131
Int. Cl.[4] B65G *49/00*
U.S. Cl. 198—465.3 **27 Claims**



1. An injection-molded plastic assembly tray for supporting a plurality of articles during manufacturing of the articles, the assembly tray comprising:

a single frame of shallow height and elongated length compared to width, for directly supporting therein the plurality of articles arranged along the elongated length, the frame including

ends, each of said ends having a top edge and a bottom edge, the width being measured parallel to the bottom edge of said ends;

sides, connected to said ends, each of said sides having a top edge and bottom edge, the elongated length being measured parallel to the bottom edge of said sides; and

torsion boxes, extending along substantially all of the elongated length of each of said sides at the top edge thereof, for providing rigidity of said single frame, each torsion box having a solid top, solid sides, solid ends, an open bottom and stacking spacers abutting and supporting the sides and top of each torsion box, the stacking spacers extending through the open bottom of the torsion box so that when a first assembly tray is stacked above an empty second assembly tray, the stacking spacers of the first assembly tray contact the top of the torsion box of the second assembly tray; and

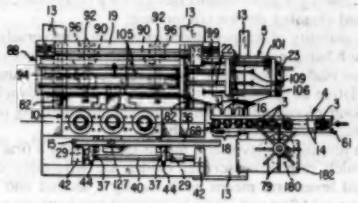
a bottom, connected to the bottom edge of each of said sides and said ends, having a continuously open area along the elongated length through which each of the plurality of articles can be directly accessed during manufacturing.

4,694,951

BOTTOM LOADER FOR A CONVEYOR MEANS

Joseph F. Gibbemeyer, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Oct. 4, 1985, Ser. No. 784,074
Int. Cl.[4] B65G *47/08*
U.S. Cl. 198—468.3 **14 Claims**



1. A bottom loading means to load a group of like-shaped elongated vertically depending articles into a corresponding number of grippers that are part of a conveyor system for such articles which means comprises:

a feed means to present a group of said articles at a reception point with a first spacing in a substantially horizontal machine direction line one behind the other;

said grippers being located by said conveyor system during loading at a load point downstream in machine direction of said reception point and elevated above the upper ends of said articles along an extension of said line and spaced apart another and different amount than said first spacing;

a backing means and a sled assembly each movably supported on opposite sides of said group between said reception and load points;

said sled assembly being movable in a cross machine direction at said reception point to engage each article in said group whereby said articles are supported to depend from said sled assembly and for movement along said extension;

an elevator means at said load point disposed with a loading member for each article in the group to be directly underneath each of such grippers when an article depending from said sled is presented between the elevator and grippers for loading each of said group into a corresponding gripper by a vertical movement;

said backing means and sled assembly together further comprising means to engage said group at said reception point, move the group along said line to said load point, and change the spacing of articles in said group from said first to said another spacing; and

means to cause disengagement and engagement of said backing means and sled assembly from said group at said load point during said vertical movement of loading.

4,694,952

SCRAPER CLEANING APPARATUS FOR REVERSIBLE CONVEYOR BELTS

Johan B. A. Meijer, Hellevoetsluis, Netherlands, assignor to Rodiac Intercessor Ltd., Zug, Switzerland

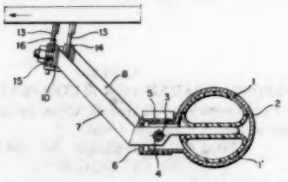
PCT No. PCT/EP84/00156, § 371 Date Dec. 3, 1984, § 102(e) Date Dec. 3, 1984, PCT Pub. No. WO84/04516, PCT Pub. Date Nov. 22, 1984

PCT Filed May 16, 1984, Ser. No. 681,999

Claims priority, application Netherlands, May 16, 1983, 8301730

Int. Cl.⁴ B65G *45/00*

U.S. Cl. 198—499 **5 Claims**



1. A conveyor belt cleaning device for a reversible conveyor belt, said cleaning device comprising:

(a) a plurality of scraper blades extending transversely of and each being narrower than the width of the conveyor belt, said blades being positioned at substantially the same angle relative to the surface of the belt, spaced from each other along a longitudinal axis of the belt, and defining overlapping contact areas on the belt;

(b) a plurality of lever arm means each having a first end on which respective scraper blades are adjustably carried, said lever arm means each having a second end spaced from said first end, and a lever pivot axis between said first and second ends, said lever pivot axes extending transversely to the longitudinal axis of the belt, successive pivot axes offset from and substantially parallel to each other;

(c) supporting means for pivotally supporting said lever arm means for pivotal movement about said pivot axes so that said blades are able to yield to obstructions in the conveyor belt;

(d) first and second flexible vessel means positioned on opposite sides of each said lever arm means adjacent said second ends to impart simultaneous pivotal movement to all of said lever arm means upon coordinated flexing of said first and said second vessel means so that the introduction of pressurized fluid into one of said vessel means causes pivotal movement of all said lever arm means to move said scraper blades into engagement with the conveyor belt and the introduction of pressurized fluid into the other of said vessel means causes pivotal movement of said lever arm means to move said scraper blades out of engagement with the conveyor belt.

4,694,953

DRIVE FOR DOUBLE GRIPPER CHAIN CONVEYOR

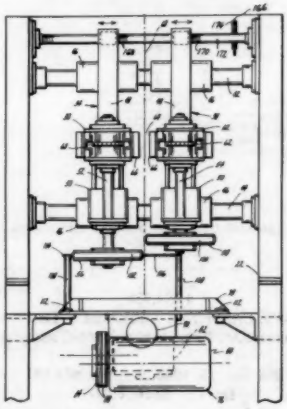
Robert E. Murphy, Utica; Gary R. Ballard, Royal Oak, and Rodney D. Kuechenmeister, Utica, all of Mich., assignors to Automation Service Equipment, Inc., Warren, Mich.

Filed Jun. 12, 1985, Ser. No. 743,736

Int. Cl.⁴ B65G *15/14*

U.S. Cl. 198—627 **14 Claims**

1. In a conveyor for conveying articles along a conveyance path which is cooperatively defined by and between confronting portions of two endless gripper chain assemblies operated in unison in opposite senses by a drive such that said confronting portions grip and convey articles along the conveyance path, the improvement which comprises said drive comprising a pair of shafts each of which constitutes an input to a corresponding one of said two gripper chain assemblies, a power output shaft, and coupling means for operatively coupling said power output shaft with said pair of shafts for causing said pair of shafts to rotate in opposite senses and thereby similarly operate said gripper chain assemblies, said coupling means comprising a non-twisted endless drive member between said power output shaft and one of said pair of shafts in an operative arrangement such that rotation of said power output shaft in one sense causes said one of said pair of shafts to rotate in the same sense and said coupling means comprising a twisted endless drive member between said power output shaft and the other of said pair of shafts in an operative arrangement such that rotation of said power output shaft in said one sense causes the other of said pair of shafts to rotate in the opposite sense, and in which the endless gripper chain assemblies of the conveyor are relatively adjustably positionable toward and away from each other and said pair of shafts are correspondingly



relatively adjustably positionable toward and away from each other in accordance with the adjustable positioning of said endless gripper chain assemblies, in which said power output shaft is adjustably positionable in correlation with the relative positioning of said pair of shafts to maintain said drive members in operative arrangement with said pair of shafts for different adjustment positions of said endless gripper chain assemblies with respect to each other, and in which the axes of said pair of shafts and of said power output shaft are parallel with each other and the axis of said power output shaft is disposed in a plane which is equidistant from the axes of said pair of shafts, and said pair of shafts are adjustably positionable toward and away from each other within a common plane which is perpendicular to said central plane, and the axis of said power output shaft is adjustably positionable within said central plane toward and away from said common plane.

4,694,954

COMPACT DISC DISPENSING AND STORAGE ASSEMBLY

Ira L. Moss, 176 Beach 146th St., Neponset, Queens, N.Y. 11694

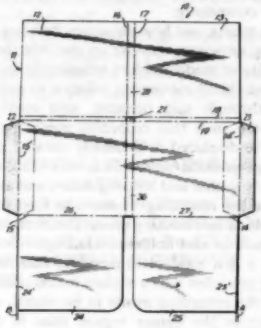
Continuation-in-part of Ser. No. 788,932, Sep. 22, 1986, Pat. No. 4,620,630. This application Sep. 22, 1986, Ser. No. 909,584

Int. Cl.⁴ B65D *85/57*

U.S. Cl. 206—45.26 **8 Claims**

1. As a new article of manufacture, a compact disc and packaging assembly convertible from a merchandising to a storage mode comprising an integral generally rectangular blank of rigid material, a cruciform fold structure formed in said blank, said structure including a proximately spaced first pair of longitudinal fold lines extending substantially medially of said blank and dividing said blank into front and rear panels

separated by a longitudinal spine portion and a proximately spaced second pair of fold lines extending substantially medially of said blank in a (transversed) transverse direction and dividing said blank into upper and lower panels separated by a transverse spine portion, a flap member including first and second margins connected to a surface of said blank along a side and bottom edge respectively of one of said panels, the longitudinal and transverse extent of said flap being less than the (distance between said edges and said foldlines) longitudinal and transverse dimensions respectively of said panels, a compact disc member at least partially encompassed int he space betwen said flap and said one of said panels, said blank being folded inwardly about said first fold lines to dispose said flap member betwen said front and rear panels, a planar stiffener member interposed between said front and rear panels in registry with said flap member, said stiffener member extending from said bottom edge to a level at least above said second



pair of fold lines, and a removable transparent film member encompassing and sealing said device and maintaining said front and rear panels and said stiffener member in substantial coplanar alignment, said blank after removal of said film and stiffener member being foldable about said first and second pairs of fold lines to define a compact storage container for said disc.

6. As a new article of manufacture, a compact disc and convertible display shiftable between merchandising and storage codes comprising front and rear rigid and congruent panel members separated by a first pair of spaced parallel hinge lines, said lines defining therebetween a vertically extending spine portion, a second spaced parallel pair of hinge lines formed medially of said panel members and extending transversely of said first pair of hinge lines, said second pair of hinge lines defining a spine portion therebetween, said second pair of hinge lines dividing said front and rear panel members into upper and lower sections, the portions of said panel member encompassing the intersection of said first and second pairs of hinge lines being removed, a flap portion formed on a first surface of a section of one said panel member, a disc member disposed between flap portion and said one section, said panel members being folded about said first pair of hinge lines such that said first surfaces of said members are justaposed in parallel spaced relation, a planar stiffener member interposed between said panel members in spanning relation of said second pair of hinge lines, and a removable film member encompassing said justaposed panel members and retaining said panel members and hence said disc and stiffener in said positions.

7. As a new article manufacture, a compact disc container comprising an integral generally rectangular blank of rigid material, a cruciform fold structure formed in said blank, said structure including a proximately spaced first pair of parallel longitudinal fold lines extending substantially medially of said blank and dividing said blank into front and rear panels separated b a longitudinal spine portions and a proximately spaced second pair of transverse parallel fold lines extending substantially medially of said blank in a transverse direction and dividing said blank into upper and lower panels separated by a transverse spine portion, the portions of said blank encompassing the intersection of said first and second pairs of fold lines being removed, an integral flap member formed on said blank, said flap member being of lesser size than said panels and including a fold line defining a first common margin with one of said lower panels, said flap being folded into parallel relation to said one lower panel and including a second margin bonded to a second outer margin of said one lower panel, said flap being tensioned in a direction away from that pair of said fold lines parallel to said second margin when bonded whereby said flap is secured in stretched condition and urged to lie substantially flatwise against said one lower panel, said container being in a folded condition wherein the same is first folded about said transverse fold lines and thereafter folded about said longitudinal fold lines.

4,694,955

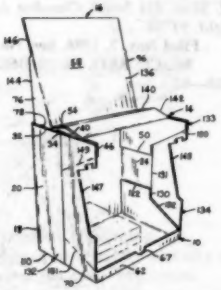
DISPLAY CARTON

Kenneth A. Rank, Jr., 409 Balsam Ct., Schaumburg, Ill. 60193

Filed Jul. 7, 1986, Ser. No. 882,409

Int. Cl.[4] B65D *51/00*

U.S. Cl. 206—45.29 **7 Claims**



1. A display carton, comprising:

a box-like shipping container having a set of walls including a top wall, a bottom wall, a front end wall, a back end wall, and side walls,

said top wall including a substantially rectangular top panel hingeably connected to said back end wall and a substantially rectangular upper panel hingeably connected to said top panel, said top panel defining locking tab-receiving holes, said upper panel having substantially the same lateral width as said top panel and being in substantial coplanar relationship with said top panel during shipment of said carton;

said front end wall having a substantially rectangular forehead panel hingeably connected to said upper panel and a substantially rectangular display panel hingeably connected to said forehead panel, said forehead panel being substantially similar in size to said upper panel and substantially smaller than said display panel, said display panel having substantially the same lateral width as said forehead panel and being in substantially coplanar relationship with said forehead panel during shipment of said carton;

each of said side walls having an ear hingeably connected to said display panel, said ear having a locking tab;

said upper panel, forehead panel, display panel, and said ears being pivotable from a normally closed shipment position substantially blocking access into the interior of said container to an open display position with said locking tabs lockably engaging said locking tab-receiving holes of said top panel, said display panel and said forehead panel cooperating with said upper panel and ears for supporting said displaying at least some of the merchandise shipped in said container in said open display position, said front end wall in said open display position defining an access opening for viewing any remaining merchandise in said container, and

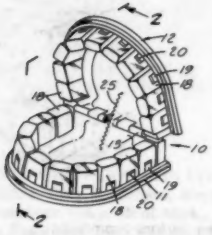
said forehead panel in said open display position comprising a ledge having substantially the same lateral width as said display panel, said ledge extending laterally across and forwardly from said display panel at an upward angle of inclination for carrying and helping to support merchandise on said display panel.

4,694,956

DISPLAY RECEPTACLE FOR DECIDUOUS TEETH

Edward H. Sims, 521 North Chandler Avenue "B", Monterey Park, Calif. 91754

Filed Nov. 7, 1986, Ser. No. 928,388
Int. Cl.[4] A61K *19/10*; B65D *85/00*
U.S. Cl. 206—83 **8 Claims**



1. A display receptacle for deciduous teeth comprising:

spaced apart upper and lower generally U-shaped members movable connected together crosswise of their generally straight transverse rear perimeters; and

an arcuate row of tooth-like receptacles connected along the facing rim edge portions of said upper and lower members each adapted to receive and store a deciduous tooth and each including hinge means connecting the same to a respective one of said upper and lower members.

4,694,957

CONTAINER FOR FLAT RECORDING MEDIA

Peter Ackeret, Allmendstr. 18, CH-8700 Kusnacht, Switzerland

Continuation of Ser. No. 645,061, Aug. 28, 1984, abandoned. This application Dec. 18, 1986, Ser. No. 943,550
Claims priority, application European Pat. Off., Aug. 29, 1983, 83108481.9
Int. Cl.[4] B65D *85/57*
U.S. Cl. 206—309 **38 Claims**

1. Apparatus for use in the storage of disc-shaped flat recording media comprising:

housing means, said housing means defining an interior space having an access opening on one side thereof;

a plurality of media holders mounted in said housing means for individual movement relative to said housing means and through said opening, said media holders being mounted such that recording media positioned thereon may be displaced in generally parallel planes between a storage position where such recording media is located entirely within said housing means and an ejected position where the recording media is at least in part positioned outside of said housing means for removal from said holders, each of said holders including:

at least a first rigid plate member, said first plate member being provided with a surface recess commensurate in size with the recording media to be stored, said recess being deeper in the center region than in the edge region whereby a recording media positioned therein will be supported only by a portion thereof adjacent its edge;

means defining a recording media insertion slot at a first end of the holder; and

means defining a generally rectangularly shaped media holder front wall, the front wall covering the insertion slot of the holder when the holder is in the storage position, said front wall defining means being displacably connected to the holder for movement of said front wall into and out of registration with the insertion slot, the front wall being oriented substantially transversely with respect to the plane of movement of a stored recording media when the holder is in the storage position, the front wall being spaced in close proximity to the front wall of adjacent holders when the holder is in the storage position whereby said front walls cooperate to substantially entirely cover said housing means access opening when all of said holders are in the storage position; and

means for resiliently biasing each of said holders toward the ejected position.

4,694,958

SAFETY STRIP FOR WIRE HOOK FASTENERS

Edward C. Musil, Lyons, Ill., assignor to Flexible Steel Lacing Company, Downers Grove, Ill.

Filed Dec. 13, 1985, Ser. No. 808,522
Int. Cl.[4] B65D *85/24*
U.S. Cl. 206—340 **8 Claims**

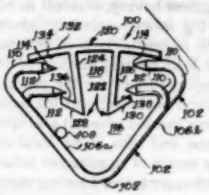
1. A safety strip for protecting and covering the pointed ends of generally triangular shaped wire fasteners held in parallel relationship in a strip, the safety strip comprising:

a body of plastic for extending longitudinally along the length of the strip of parallel wire fasteners,

an exterior cover portion on the body having a flange of a predetermined width extending outwardly of the pointed ends for covering the pointed ends of the wire fasteners,

a flexible detent means on the body and projecting from the exterior cover portion inwardly through a throat formed

by the sharp hooks for detenting engagement with the wire fasteners, the detent means having a pair of depending legs attached at upper ends to a central portion of the flange, said legs being flexible and deflected inwardly by the pointed ends of the wire fasteners when being pressed



through the throat and expanding outwardly after passing through the throat, and

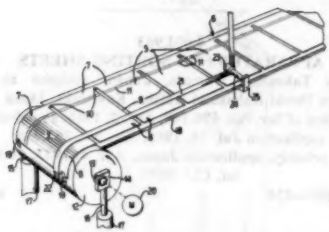
feet on the lower free ends of the legs inclined upwardly and outwardly to be engaged by the hooked ends, said feet defining with said flange a pair of parallel channels with pointed end of the wire fasteners in the channels.

4,694,959

MAINTAINING SINGLE LINK CHAIN BAGS AGAINST SKEWING

Steven Ausnit, New York, and Per Bentsen, Suffern, both of N.Y., assignors to Minigrip, Inc., Orangeburg, N.Y.

Filed Jan. 29, 1986, Ser. No. 823,640
Int. Cl.[4] B65D *33/16*; B65B *27/08*
U.S. Cl. 206—390 **23 Claims**



7. A method of maintaining free from skewing a series of bags having first and second end portions and separated from one another except at single link means connecting the first end portions of the bags and thereby joining the bags into a continuous bag chain wherein said second end portions of the bags are entirely separated from one another, comprising:

reeling the bag chain upon itself into a storage roll;

and engaging against one face of said second end portion means for maintaining the bags in the reeled chain substantially free from skewing relative to one another.

4,694,960

TEAR OPEN BLISTER PACKAGE

Cornelius M. Phipps, Glen Ellyn, and William C. Pershak, Chicago, both of Ill., assignors to Plastic Specialties, Inc., Glen Ellyn, Ill.

Filed Jun. 26, 1986, Ser. No. 879,054
Int. Cl.[4] B65D *75/58*
U.S. Cl. 206—469 **20 Claims**

1. In a package having a generally flat backing and a blister receptacle formed of plastic material and a peripheral flange which is secured to the backing, the improvement comprising,

a. tab means extending from said receptacle at and intersecting said flange for grasping during opening, said tab means being unsecured to the backing,

b. a tear initiation cut through the plastic material of the receptacle at the intersection of said tab means and said flange for initiating tearing of the plastic material, and

c. a tear guide extending from said cut, said tear guide comprising a lineal bead in said receptacle of a lesser thickness than the adjacent plastic material of said receptacle.

15. In a package having a generally flat backing and a blister receptacle formed of plastic material and a peripheral flange which is secured to the backing, the improvement comprising,

a. means forming a tab extending from said receptable at and intersecting said flange for grasping during opening, said tab means being unsecured to the backing,

b. said flange being sealed to the backing, and including an area of the flange adjacent said tab which is not sealed to the backing, and

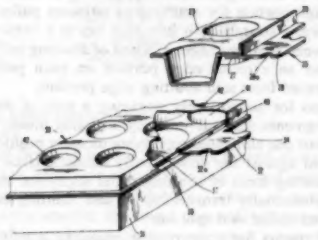
c. a tear initiation cut through the plastic material of the receptacle at the intersection of said tab means and said flange for initiating tearing of the plastic material.

4,694,961

FOOD CARRIER ASSEMBLY

Rita J. Menendez, 126 Montgomery La., Mingo Jct., Ohio 43938

Filed Sep. 17, 1985, Ser. No. 776,977
Int. Cl.[4] B65D *21/02, 25/28*; B65J *1/34*
U.S. Cl. 206—508 **8 Claims**



1. A food carrier assembly comprising:

(a) a baking pan shaped to receive a plurality of cupcakes and having an outer rim and a lid portion,

(b) a supporting ring member having an underlying rim supporting section below the outer rim to only provide support for transporting the baking pan, and

(c) handle means disposed on the supporting ring member for carrying the baking pan as a compact carrier assembly,

(d) the supporting ring member being removably disposed around the outer rim and including a gripping portion, and

(e) the handle means includes a hand gripping portion and coupling means for detachably connecting to said gripping portion on the supporting ring member,

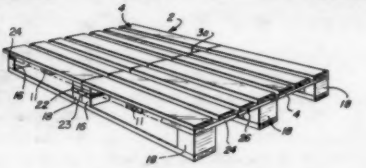
(f) the gripping portion includes tab means projecting outwardly from opposing sides of the supporting ring member with the opposed tab means being in alignment with respect to each other.

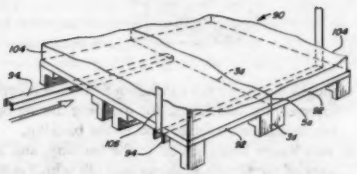
4,694,962

STANDARD DIMENSION PALLET ASSEMBLY FORMED OF SEPARATE ABUTTED SEGMENTS

Ronald H. Taub, John Hancock Bldg., 175 E. Delaware, Chicago, Ill. 60035

Filed Jun. 10, 1985, Ser. No. 742,992
Int. Cl.[4] B65D *19/26*
U.S. Cl. 206—600 **11 Claims**





1. In a product transport pallet assembly having a load bearing face of standard dimensions; an improved product support pallet comprising, in combination:

a plurality of discrete pallet segments each having an upwardly facing, load bearing surface, and an opposite downwardly facing surface, each of said pallet segments providing an aliquot portion of the pallet's load bearing face of standard dimensions;

each of said discrete pallet segments having leg means extending therebelow for providing a member-receiving space between said downwardly facing surface and a planar surface upon which said transport pallet assembly is to be supported by said leg means;

each of said segments further having at least one abutting edge portion for abutting an adjacent pallet segment to form a straight split line, that lies in a vertical plane between adjacent edges of a pair of abutting pallet segments, and an external edge portion on each pallet segments spaced from said abutting edge portion;

means for supportively engaging a pair of discrete pallet segments, said supportively engaging means including at least one elongated rigidifying member positioned beneath and against the downwardly facing surface of said load bearing faces of abutting pallet segments, and extending substantially transversely to said abutting edge portions that define said split line;

said means for supportively engaging a pair of discrete, adjacent, pallet segments providing two opposite end edges, each of which is located substantially co-terminal with an external edge portion of one of the pallet segments; and

selectively installable and removable holding means, for selectively engaging and securing each of the ends of said elongated rigidifying member to an adjacent pallet segment for maintaining said pair of adjacent pallet segments as a substantially rigid pallet assembly.

8. An improved product transport pallet assembly having a load bearing face and comprising, in combination:

a plurality of discrete pallet segments which, when assembled together, define the product transport pallet assembly;

each discrete pallet segment having an upwardly facing, load bearing surface, and an opposite and downwardly facing lower surface, each of said pallet segments constituting an aliquot portion of the pallet assembly's load bearing face;

each of said pallet segments having a plurality of edges, at least one edge being an abutting edge portion, for abutting an edge of an adjacent pallet segment to form only a continuous straight split line that lies in a vertical plane defined between said adjacent abutting edges of each of abutting pallet segments;

each pallet segment having, adjacent its edges, a plurality of supportive leg means extending downwardly from the downwardly facing surface of the pallet segment, for spacing the load bearing surface of the pallet segment above a support surface for the product transport pallet assembly, some of the support leg means for each pallet segment being located adjacent said split line that lies in a vertical plane and also being located adjacent to and abutting leg means of an adjacent pallet segment; and

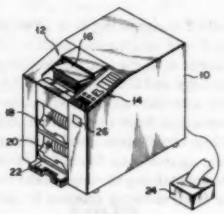
a first severable connective banding means, located below the load bearing surfaces of a pair of adjacent one of said pallet segments, said first connective banding means being wrapped only around abutting ones of said supportive leg means for holding said supportive and abutting leg means of said adjacent, abutting, pallet segments together along the straight split line therebetween, and a second, severable, connective banding means located spaced below the load bearing surfaces of each of the pair of adjacent, abutting, pallet segments, but being located in a different horizontal plane than said first connective banding means, and being wrapped around the exterior periphery of all exterior ones of said supportive leg means of the pair of adjacent, abutting, pallet segments, whereby to hold said pair of pallet segments together, but permitting selective separation of the pair of pallet segments along said split line by severing said first and second connective banding means that hold said adjacent pair of pallet segments together along the split line.

4,694,963

APPARATUS FOR SORTING SHEETS

Sumiyoshi Takesako, Yamato, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 596,148, Apr. 2, 1984, abandoned. This application Jul. 14, 1986, Ser. No. 883,445
Claims priority, application Japan, Apr. 4, 1983, 58-59009
Int. Cl.[4] B07C *5/34*
U.S. Cl. 209—534 **6 Claims**



1. An apparatus for sorting a mixture of different kinds of bank notes into at least one of a first stacker, a second stacker and a third stacker, comprising:

means for feeding said bank notes one by one;

means for specifying a denomination of said notes;

means for judging a denomination of judgeable notes which are fed by said feeding means, and for indicating unjudgeable notes which cannot be judged by said judging means;

stacking means for stacking said judged notes in one of said stacker; and

mode setting means for setting one of: (1) a first mode in which said specifying means specifies a single denomination, said specified denomination of notes is stacked into said first stacker, an unspecified denomination of notes is stacked into said second stacker and said unjudgeable

notes are stacked into said third stacker, (2) a second mode in which said specifying means specifies no denomination, judgeable notes are alternately stacked into said first and second stackers in units of a predetermined number of notes and unjudgeable notes are stacked into said third stacker, and (3) a third mode in which said specifying means specifies a first and a second denomination, said first specified denomination of notes is stacked into said first stacker, said second denomination of notes is stacked into said second stacker, and both of an unspecified senomination of notes and unjudgeable notes are stacked into said third stacker.

4,694,964

DEVICE FOR CONVEYING COMPONENTS PARTICULARLY INTEGRATED CHIPS, FROM AN INPUT MAGAZINE TO AN OUTPUT MAGAZINE

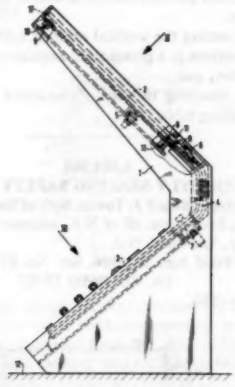
Ekkehard Ueberreiter, Karwendelstrasse 1, D-8011 Zorneding/Pöring, Fed. Rep. of Germany

Continuation of Ser. No. 820,891, Jan. 17, 1986, abandoned, which is a continuation of Ser. No. 666,826, Oct. 31, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 917,292

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1983, 3340183

Int. Cl.[4] B07C *5/34*; G01R *31/28*

U.S. Cl. 209—549 **10 Claims**



1. In a device for conveying components received in individual, separate receiving portions of an input magazine, to individual, separate receiving portions of an output magazine, with a testing device arranged between the input magazine and the output magazine, to which are supplied, one after the other, by means of a first conveyor device, the individual components, from the receiving portions of the input magazine, for testing, and which discharges the tested components to a second conveyor device, which enables the components to be discharged to a receiving portion of the output magazine established by the testing device, the combination of storage and indicating devices associated with each receiving portion of the output magazine, which devices are each capable of storing and indicating information corresponding to a component testing or measuring class, and means for moving the second conveyor device in such a manner, relative to the receiving portions of the output magazine on the basis of comparison of data from said testing device and preassigned data stored in the individual storage and indicating devices, that a component, established by the testing device as belonging to a certain component testing or measuring class, can be discharged into the receiving portions associated with this testing or measuring class, said means for moving the second conveyor device also being operative to assign to the storage and indicating device of an available receiving portion a testing or measuring class corresponding to data received from said testing device which does not correspond to preassigned data and to discharge components of such testing or measuring class into said receiving portion.

4,694,965

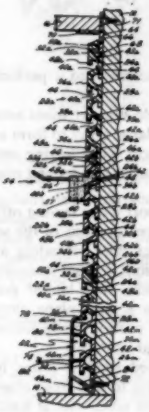
MODULAR PANELS FOR A DISPLAY APPARATUS

Raymond Parnell, Cincinnati, Ohio, assignor to The Tomorrow Group, Inc., Cincinnati, Ohio

Filed Sep. 16, 1986, Ser. No. 907,877

Int. Cl.[4] A47F *5/08*

U.S. Cl. 211—87 **10 Claims**



1. A display panel comprising:

a back surface;

a plurality of first and second web pairs spaced along said back surface, each pair of said first and second webs extending outwardly from said back surface at an angle relative to one another forming a channel therebetween;

a plurality of spaced front flanges extending substantially parallel to said back surface, a first front flange being connected to a first web of one of said web pairs and the remaining front flanges being connected to said first web of one web pair and said second web of an adjacent web pair, said front flanges overlying a portion of its respective underlying channel so that when viewed from said front flanges the viewer sees a series of parallel, spaced longitudinal channels;

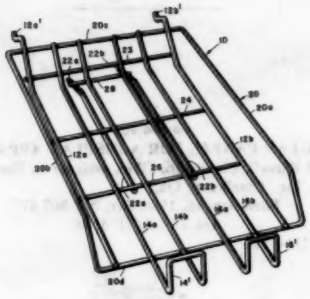
first side edge means connected to said first front flange at one end of said back surface and second opposed side edge means connected to the opposite end of said back surface, said first side edge means of one display panel being adapted to engage said second side edge means of another display panel for joining one panel to another panel, said first side edge means of one panel cooperating with an adjacent front flange of said another panel to define a channel substantially identical to said channels in said another panel thereby concealing the joinder of said panels from view.

4,694,966

MERCHANDISING TRAY

Robert E. Sorenson, Comstock Park, Mich., and John M. Scriba, Jr., Western Springs, Ill., assignors to Knape & Vogt Manufacturing Co., Grand Rapids, Mich.

Filed Jul. 17, 1986, Ser. No. 886,326
Int. Cl.[4] A47F *5/08*
U.S. Cl. 211—88 **5 Claims**



1. A tray for attachment to a perforated vertical support panel comprising:

a plurality of article support wires arranged in spaced, generally parallel planar array to form a tray bottom in a first plane, said support wires having rear portions projecting diagonally upwardly in a second plane obtuse to said first plane;

a pair of said support wires having offset rear terminal ends to project into perforations of the support panel;

a peripheral border wire extending around the tray, with two lateral portions, a front transverse portion and a rear transverse portion, said lateral portions and said rear portion being in a third plane elevated above said first plane, said rear portion being joined by welding to said support wire rear portions;

said first mentioned support wires having front portions joined by welding to said front transverse portion of said peripheral border wire, with at least some of said support wires extending forwardly beyond said border wire, and terminating in upwardly extending hairpins;

and compression brace wires extending downwardly rearwardly with respect to said tray bottom, being joined by welding to said tray bottom, and having rearwardly protruding ends for insertion in holes in the support pannel, said brace wires having depth limiting shoulder means for limiting the depth of insertion of said brace wires into the support panel.

4,694,967

DRAFTING TABLE ACCESSORY STORAGE ATTACHMENT DEVICE

Lawrence J. Burke, P.O. Box 306, Manhattan Beach, Calif. 90266

Filed Apr. 17, 1986, Ser. No. 853,360
Int. Cl.[4] A47F *3/14*
U.S. Cl. 211—126 **5 Claims**

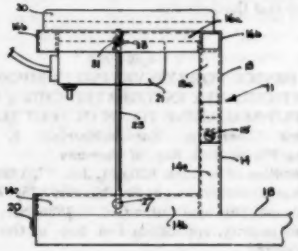
1. An accessory and storage attachment for a drafting table comprising:

an upper frame section including a rectangular top open frame structure formed by a pair of opposing longitudinal arms joined together at their opposite ends by a pair of opposing cross arms, and a pair of vertical arms extending normally from the opposite ends of one of said longitudinal arms;

a lower frame section formed by a pair of similar opposing frame members, each of such frame members including a vertical arm and a leg fixedly attached to and extending normally from said vertical arm;

means for pivotally connecting one end of each of the vertical arms of said lower frame section to one end of a respective one of the vertical arms of said upper frame section;

a tray having a plurality of slots formed therein for use in mounting drafting tools and accessories on said tray, said tray having an indented portion formed therein;



said tray being supported on said upper frame section, with the indented portion thereof nested in the top open frame structure;

means for setting the vertical arms of said upper and lower frame sections in a preselected angular position relative to each other, and

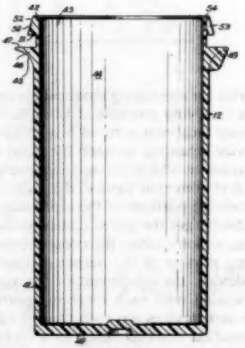
means for attaching the legs of the lower frame member to said drafting table.

4,694,968

TIGHTLY SEALING SAFETY CAP

John D. Proctor; Edward J. Towns, both of Summit, and Edward M. Brown, Livingston, all of N.J., assignors to Lermer Packaging Corp., Garwood, N.J.

Filed Jun. 20, 1986, Ser. No. 876,474
Int. Cl.[4] B65D *55/02*
U.S. Cl. 215—224 **1 Claim**



1. In a combination container and flexible safety type cap therefor, the container including an open end portion defining a mouth and having a peripheral flange thereon, at least one segment of which is discontinuous, said gap including a generally planar end wall, a cylindrical side wall, and a plurality of inwardly facing projections selectively engaging said peripheral flange when said cap is in engaged condition upon said container, improved sealing means comprising: said container having a flange thereon surrounding said mouth, said flange

having a frusto-conical surface thereon, said cap having a rim member having an inner surface corresponding to said frusto-conical surface to effect a sealing action therebetween, and retaining flange means on a second inner surface of said cap selectively positionable beneath said frusto-conical surface to effect a locking action between said cap and said container, said retaining flange means having an angular length of at least one-hundred eighty degrees and substantially less than three hundred sixty degrees; and a projection in coplanar relation relative to said retaining flange means and alignable within a discontinuous segment of said peripheral flange to permit disengagement of said cap, said projection being generally opposite a midpoint on said flange retaining means; whereby upon the flexing of said container to other than circular cross-sectional configuration at the mouth thereof, said retaining flange means on said cap will flex to like cross-sectional configuration to resist other than normal manipulation to disengage said cap from said container.

4,694,969

CONTAINER CLOSURE

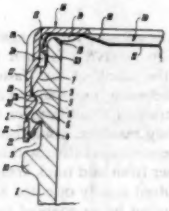
Rodney J. Granat, Caufield, Australia, assignor to ACI Australia Limited, Melbourne, Australia

Filed Nov. 15, 1984, Ser. No. 672,108

Claims priority, application Australia, Nov. 17, 1983, PG2423; Jul. 16, 1984, PG6014

Int. Cl.[4] B65D *41/48*

U.S. Cl. 215—252 **16 Claims**



1. A closure for an open necked container of the type having a sealing rim defining a container opening and at least one external annular rib spaced from the said rim for non-threaded engagement by said closure; said closure includng a container cover member adapted to extend over and close the opening of the container, with a peripheral edge of the cover member extending marginally beyond the container sealing rim, and a resilient cover holding member integrally moulded from plastics material, said cover holding member being adapted to hold said container cover member in sealing abutment with the container rim and including a cover encapsulating portion extending radially over said peripheral edge, a depending portion entending below said peripheral edge, at least one annular retaining rib projecting radially inwardly from said depending portion and spaced from said encapsulating portion for non-threaded engagement below said annular rib of the container, and retaining means extending beneath said peripheral edge to hold said cover member within said cover holding member; said retaining means comprising a plurality of lugs spaced circumferentially around, and projecting radially inwardly from, said depending portions; said lugs each being spaced from said encapsulating portion and said cover holding member being operable such that, on rotation of said cover holding member on a container, one of said lugs engages an axially inclined ramp surface defined by the container, said cover holding member twists out of a co-axial relationship with the container opening to initiate disengagement of said at least one retaining rib from the at least one annular rib of the container and simultaneously causes said one lug to locally engage said peripheral edge and initiate lifting of said container cover member from the container rim.

4,694,970

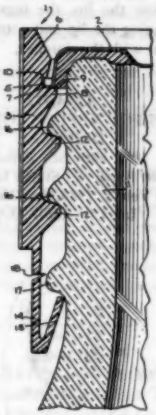
TAMPER EVIDENT COMPOSITE CLOSURE

Thomas H. Hayes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Jun. 16, 1986, Ser. No. 874,639

Int. Cl.[4] B65D *41/34*

U.S. Cl. 215—252 **10 Claims**



1. In a composite closure for a container having a cover fitted into a molded plastic ring and having container engaging members on the radially inner surface of said ring, the improvement comprising:

said ring comprising a relatively thin cylindrical member with a cover receiving groove positioned downwardly from the ring top and engaging the outer edge of the cover portion

said container engaging members comprising continuous threads, and

the outer diameter of said groove being greater than the inner diameter of said continuous threads facilitating the insertion of said cover through the top of said ring.

4,694,971

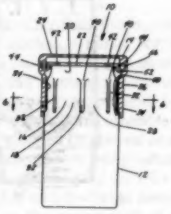
TAMPERPROOF PACKAGE

Thad Elsmo, 208 E. Four Mile Rd., Racine, Wis. 53402, and Ronald Horvath, 4325 Kennedy Dr., #204, Racine, Wis. 53404

Filed Dec. 4, 1986, Ser. No. 937,739

Int. Cl.[4] B65D *39/04*

U.S. Cl. 215—253 **19 Claims**



1. In a package of the type having a container with a substantially cylindrical neck and a lip, a closure with a cover portion and a depending skirt sleeved over the neck, the neck outside and skirt inside forming a pair of facing surfaces, and tamperproof means, the improvement comprising:

a plurality of mating sets of grooves and groove-engaging male members on the facing surfaces, each groove axially-parallel on one facing surface and its corresponding male member frangibly connected to the other facing surface;

a flange extending radially outwardly from the container to form the lip, the flange having notches therealong; and

lugs spaced around the skirt inside surface and projecting inwardly below the lip, the lugs having coplanar top surfaces engaging the lip and rotatable with the closure into alignment with the notches.

4,694,972

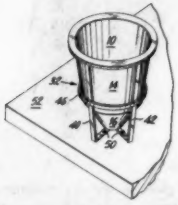
APPARATUS FOR REFUSE COLLECTION AND DISPOSAL

Michael Bimonte, 1863 64th St., Brooklyn, N.Y. 11204, and Dennis Cleary, 46 Barth St., Staten Island, N.Y. 10308

Filed Feb. 5, 1986, Ser. No. 826,313

Int. Cl.[4] A63B *55/04*

U.S. Cl. 220—401 **7 Claims**



1. A refuse liner comprising a non-self-standing body having an uppermost opening, a generally cylindrical portion extending downwardly from said opening, and a frustro-conical portion extending downwardly from such cylindrical portion, a lip extending radially outwardly of said cylindrical portion adjacent said opening and a gripping detent being formed in said cylindrical portion adjacent said frustro-conical portion.

4,694,973

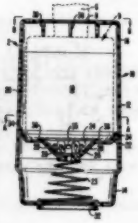
WARMING DEVICE FOR DISPOSABLE TOWEL DISPENSER

K. Daniel Rose, Healdsburg; Charles Yarbrough, Kenwood, and Alan F. Strachan, Santa Rosa, all of Calif., assignors to Warmwipes, Inc., Santa Rosa, Calif.

Filed Dec. 2, 1985, Ser. No. 803,465

Int. Cl.[4] A47K *10/38;* **B65D** *83/08*

U.S. Cl. 221—46 **23 Claims**



1. A dispenser for disposable pre-wetted towels prepackaged in plastic canisters, comprising:

a cup having an upper sector sized and adapted to contain a canister and a dispenser opening in said upper sector, and a lower sector below said upper sector;

securing means to secure the canister in said upper sector of said cup, said securing means further comprising uplift means for urging the canister upwardly towards said dispenser opening of said upper sector;

incandescent light bulb means disposed within said lower sector of said cup and mounted on said uplift means for heating the canister in said cup; and

a translucent window disposed in said lower sector to be illuminated by said incandescent light bulb means.

4,694,974

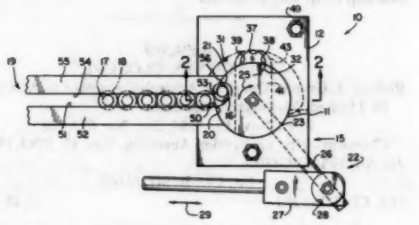
ESCAPEMENT APPARATUS FOR AN AUTOMATIC SCREW FEEDING MACHINE

Michael Heck, 302 NE. 36th St., Boca Raton, Fla. 33432, and Nathan Singer, 5710 NW. 54th Way, Tamarac, Fla. 33319

Filed Jun. 14, 1985, Ser. No. 744,629

Int. Cl.[4] B65G *59/06*

U.S. Cl. 221—263 **8 Claims**



1. Escapement apparatus for an automatic screw feeding machine adapted to receive a fastener from a track feed arrangement with the shank of said fastener being positioned within the space between tracks and to deliver said fastener to a conduit which transmits said fastener to a driver of an automatic screw feeding machine, comprising a housing having a first opening therein, means fitting within said first opening for receiving a fastener from said track arrangement comprising a rotor having a cutout axially oriented along the periphery of said rotor, said cutout being adapted to receive the shank of said fastener therein, with the head of said fastener resting on the upper surface of said rotor, the axis of said rotor being positioned at an angle to the vertical, and said cutout for receiving the shank of said fastener having a substantially semi-cylindrical shape with a near axial edge thereof co-extensively positioned and abutting with the inside edge of one track of said track arrangement, said inside edge being the edge perpendicular to the longitudinal axis of the track and at the end face thereof, whereby a fastener received within said cutout is caused to be urged downstream of the edge at the inside surface and the end face of the other track, means connected to said means within said first opening for delivering said fastener to a drop point comprising a substantially cylindrical opening which is substantially free of obstructions, said cylindrical opening being adapted to be connected to conduit means whereby said fastener is ducted to the driver apparatus of said screw feeding machine.

4,694,975

METHOD AND APPARATUS FOR STORING AND DISPENSING FLUIDS CONTAINERED UNDER GAS PRESSURE

Richard J. Hagan, San Carlos, Calif., assignor to McKesson Corporation, Los Angeles, Calif.

Continuation of Ser. No. 685,912, Dec. 27, 1984, abandoned, which is a continuation-in-part of Ser. No. 609,280, May 10, 1984, abandoned. This application Oct. 24, 1986, Ser. No. 924,186

Int. Cl.[4] B67B *7/00;* **B65D** *83/00*

U.S. Cl. 222—1 **13 Claims**

1. A method for storing and dispensing fluids containered under gas pressure comprising:

(a) selecting a substantially non-frangible plastic container capable of safely withstanding in excess of three atmospheres of pressure, said container having a longitudinal axis and being formed with a neck portion having an internal annular wall having a substantial surface area generally parallel to said longitudinal axis and including an opening, said container having an attachment member formed on said neck portion adapted for removably affixing a head member to said attachment member for dispensing fluid from said container;

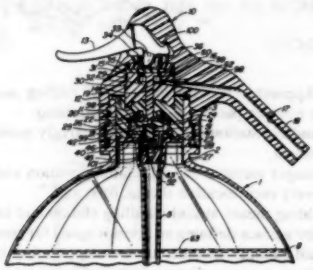
(b) selecting a valve means having an external annular wall dimensioned for gas sealing and structural connection to said internal annular wall of said neck portion mounted substantially within said container neck portion for maintaining gas pressure of at least three atmospheres and having a passage formed therein adapted for receiving a valve actuating member;

(c) mounting a syphon tube within said container having a distal end adjacent the bottom of said container and operatively connected to said valve means;

(d) bonding said external annular wall of said valve means to said internal wall of said neck portion;

(e) filling said container through said value means with a liquid under at least 3 atmospheres of pressure;

(f) selecting a removable sanitary sealing means covering said opening in said neck of said container, which removable sanitary sealing means is a cap member having internal threads and has sufficient structural integrity to prevent expulsion of said valve means under normal working pressures present in said container, and wherein said attachment member is external screw threads formed in said neck portion adjacent said neck opening for threadable registration with said cap threads, and



(g) selecting a head member having a manually engageable valve actuating member, a remote valve actuating member selectively operable by said valve actuating member and positioned for engagement with said valve means, said head member having a liquid and gas substantially impermeable resilient means forming a sealed top of said open ended chamber and separating said manually engageable valve actuating member and said remote valve actuating member, said sealed top resilient separating means being free to move so that downward motion of said manually engageable valve actuating member is transmitted to said remote valve actuating member, said remote valve actuating member extending below said sealed top resilient separating means to open said valve in response to the downward motion of said manually engageable valve actuating member, said head member having internal threads for registeration with said screw threads formed in said neck portion.

5. A container system for storing and dispensing fluids under gas pressure comprising:

(a) a substantially non-frangible container capable of safely withstanding in excess of three atmospheres of pressure, said container having a longitudinal axis and being formed with a neck portion having an internal annular wall having a substantial surface area generally parallel to said longitudinal axis and including an opening;

(b) a valve means having an external annular wall dimensioned for gas sealing and structural connection to said internal annular wall of said neck portion mounted substantially within said container neck portion for maintaining gas pressure of at least three atmospheres and having a passage formed therein adapted for receiving a valve actuating member, said external annular wall of said valve means being fixedly attached to said internal wall of said neck portion;

(c) a syphon tube mounted within said container having a distal end adjacent the bottom of said container and an end operatively connected to said valve means;

(d) a removable sanitary sealing means covering said opening in said neck of said container;

(e) an attachment means at said neck portion adapted for removably affixing a head member to said attachment means for dispensing fluid from said container; and

(f) an end tube member having an end portion formed with a flared end having a notched opening therein, being formed from a flexible material, having a bellows type mid-section and being dimensioned for connection to said syphon tube.

4,694,976

DISCHARGE APPARATUS FOR FLOWABLE MEDIA

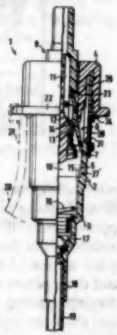
Hans-Josef Schuetz, Donaueschingen, Fed. Rep. of Germany, assignor to Ing. Erich Pfeiffer GmbH & Co. KG, Fed. Rep. of Germany

Filed Jan. 2, 1986, Ser. No. 815,569

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1985, 3503354

Int. Cl.[4] B65D *37/00*

U.S. Cl. 222—189 **21 Claims**



1. A discharge apparatus for fluid media, comprising:

a manually-operated discharge pump, for mounting on a container defining a fluid reservoir in an assembled condition of the pump and container, said discharge pump having a pump casing projecting at least by an immersing part into the fluid reservoir in the assembled condition, the pump casing being bounded on curved outer surfaces by a casing wall, the outer surfaces being substantially curved around a pump axis, a ventilating duct for the fluid reservoir being provided in said discharge pump and issuing at a venting opening in the casing wall of said immersing part; and,

a bacteria filter provided on the pump casing, traversing a part of said ventilating duct, said bacteria filter having a ring-like sealing part surrounding an effective filter section, an air inlet side and an air outlet side and being mounted with the sealing part against one of the curved outer surfaces of the casing wall of said immersing part,

said ring-like sealing part projecting from at least the inlet side of said bacteria filter and sealing the effective filter section at a substantially constant spacing from said one of the outer surfaces of the casing wall with respect to this outer surface, the bacteria filter thereby being curved around said pump axis and bounding a part of the fluid reservoir with the discharge pump and reservoir in the assembled condition, said effective filter section being arranged free of contact on both the inlet and outlet sides, said bacteria filter and an adjacent outer surface of said casing wall defining a filter inlet chamber, said venting opening traversing said outer surface opposite to the bacteria filter and being substantially smaller than a boundary of said filter inlet chamber defined by the ring-like sealing part of the bacteria filter.

4,694,977

FLUID DISPENSER

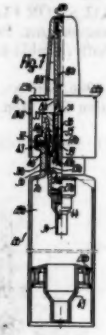
Lothar Graf, Worblingen; Leo Maerte, Sipplingen, and Thomas Skorka, Radolfzell, all of Fed. Rep. of Germany, assignors to Ing. Erich Pfeiffer GmbH & Co. KG, Fed. Rep. of Germany

Filed Sep. 11, 1984, Ser. No. 649,514

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1983, 3339180

Int. Cl.[4] B65D *83/00*

U.S. Cl. 222—259 **12 Claims**



1. A fluid dispenser, comprising:

a storage container defining a storage space extending between two opposite ends of the storage container;

a drag piston displaceable in the container and tightly sealing the storage space at one of its ends by means of a piston ring sealing said drag piston against the storage container;

a piston pump having a pump cylinder in a cylinder casing with an external shape arranged in the container at the end of the storage space opposite to the drag piston in said storage space, means defining a fluid discharge outlet leading from said pump cylinder to an area outside of the dispenser, a fluid inlet for said pump cylinder, said fluid inlet being connected to the storage space, and a pump piston displaceable in the pump cylinder along a pump axis between a pump stroke end and an initial end of a piston stroke by a handle, the piston pump forcing fluid from the fluid inlet to the fluid discharge outlet, the pump cylinder being substantially axially parallel to the drag piston, the drag piston having an inner side facing the piston pump and an outer side facing away from said inner side, said inner side defining a cup-like cavity with an internal cross-section for receiving a portion of the piston pump extending into the storage space, such that said portion of the piston pump fills the cavity of the drag piston when the storage space is empty, wherein the fluid inlet and the cylinder casing of the piston pump project into the storage space, defining a projecting cylinder casing portion thereof, the drag piston having an adapting cup forming the cavity, said cavity having an internal cross-section substantially precisely adapted to an external shape of the projecting cylinder casing portion, such that said cylinder casing portion fills the cavity of the drag piston when the storage space is emptied, said adapting cup being disposed radially inside the piston ring and extending axially past the outer side of the piston ring.

4,694,978

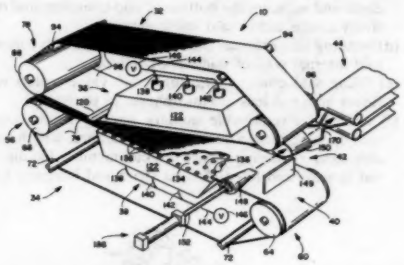
APPARATUS AND METHOD FOR SIMULTANEOUSLY INVERTING, FOLDING AND PLEATING

Dean W. Westphal, and David T. Strohbeen, both of Appleton, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 7, 1986, Ser. No. 916,256

Int. Cl.[4] A41C *5/00*; D06C *15/00*

U.S. Cl. 223—28 **15 Claims**



1. Apparatus for simultaneously folding and pleating a child's training pant or the like, comprising:

a handling station adapted for selectively positioning a pant thereat,

a plunger member at said handling station and being selectively reciprocative thereacross, and

a folding means at said handling station and having an interior surface defining an interior space for receiving therein said plunger member upon reciprocation thereof, and a pleating means disposed on said interior surface adapted for pleating a pant passed thereover, whereby said plunger member can be reciprocated against the pant to move the pant into said interior space to be simultaneously folded by said folding means and pleated by said pleating means.

4,694,979

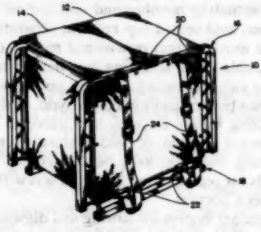
SEAT/BACKPACK/SLED COMBINATION

Lee Ables, 37858 N. Greenbay Rd., Waukegan, Ill. 60087

Filed Jun. 2, 1986, Ser. No. 869,740

Int. Cl.[4] A45C *15/00*

U.S. Cl. 224—151 **15 Claims**



1. A multifunction wilderness seat/backpack/sled combination capable of functioning as a supporting device, a backpack or a light-weight sled, said combination comprising:

a base section having first and second ends and first and second sides connecting said first and second ends;

first and second end sections each having first and second sids and, one having a first end hingeably attached to said first end of said base section and the other having a first end hingeably attached to said second end of said base section, and each having an upwardly extending portion on a second end, said first and second sides connecting said first and second ends of each of said first and second end sections;

wherein in a closed position said upwardly extending portions on said second ends of said first and second sections meet to form a substantially box-like structure with said base section to function as a supporting device or a bakcpack and in an open position with said upwardly extending portions of said first and second ends upstanding said first and second sections lie substantially in a common plane with said base section to form a sled-like structure.

4,694,980

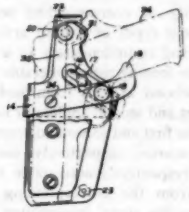
HANDGUN HOLSTER

William H. Rogers, Jacksonville, Fla., assignor to Safariland Ltd., Inc., Monrovia, Calif.

Continuation-in-part of Ser. No. 730,050, May 3, 1985, abandoned. This application Feb. 10, 1986, Ser. No. 827,816

Int. Cl.[4] F41C *33/02*

U.S. Cl. 224—243 **15 Claims**



1. In a holster for a handgun and attachable to a belt, the holster having with respect to a front and back of a wearer of the holster inner and outer spaced substantially rigid sidewalls joined together along the forward and lower rear portions thereof to define an inner expandable cavity and an open expandable top and upper rear portions for receiving a handgun therein and for removing a handgun therefrom, the improvement comprsing a first strap portion extending upwardly from adjacent said forward portion of said outer sidewall and attached by a releasable first fastener to a second strap portion extending upwardly from adjacent said forward portion of said inner sidewall and including a thumb engaging first tab adjacent said first fastener; a third elongated strap extending laterally across and affixed to said outer and inner sidewalls adjacent said open expandable top, and upper rear portions, a releasable second fastener joining ends of said third strap adjacent a rear portion of said inner sidewall with a middle finger engaging second tab on said third strap adjacent said second fastener, slideable means attaching one end of said third strap to said inner sidewall for limited expansion of said open expandable top and upper rear portions and of said inner cavity when said second fastener is opened by a middle finger engaging said second tab and a thumb engages said first tab to open said first fastener, and means in said inner cavity to engage a portion of a handgun in the holster to resist upward withdrawing of a handgun.

4,694,981

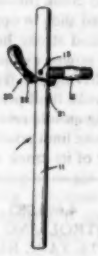
HOLDER FOR SIDE-HANDLE BATON WITH ALLEN WRENCH

John C. Miller, Jr., 415 Claydon Way, Sacramento, Calif. 95864

Filed Nov. 28, 1986, Ser. No. 935,754

Int. Cl.[4] A45F *5/00*

U.S. Cl. 224—251 **1 Claim**



1. A holder for carrying and detachably securing on the belt of a policeman a side-handle baton including an elongated tubular club and a short side-handle which is disposed perpendicular and rotatively coupled to the elongated tubular club with a screw for adjusting the rotational friction of the side-handle, said holder comprising:

a. a ring into which the elongated tubular club is inserted;

b. a strap which is mechanically coupled to said ring and which may be attached to the belt of the policeman;

c. a post which is disposed perpendicular and mechanically coupled to said ring and which prevents the elongated tubular club from rotating wlthin said ring so that the side-handle remains relatively stationary;

d. screw adjusting means for adjusting the screw of the side-handle baton, said screw adjusting means being fixedly coupled to said post.

4,694,982

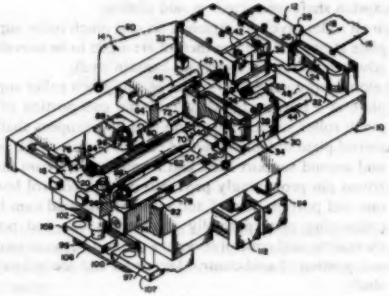
SIDE BY SIDE AIR FEEDER FOR ADVANCING STOCK TO A POWER PRESS AND THE LIKE

Edwin W. Plumb, Woodbury, Conn., assignor to Pressmate, Inc., Woodbury, Conn.

Continuation-in-part of Ser. No. 371,968, Apr. 26, 1982. This application Oct. 12, 1984, Ser. No. 660,143

Int. Cl.[4] B65H *20/18*

U.S. Cl. 226—115 **42 Claims**



1. A feeder for advancing stock in intermittent feed strokes into a downstream work station of a machine such as a power press and the like and comprising a frame, a power operated feed slide mounted on the frame for reciprocating linear movement between starting and advanced stroke limit positions, the

feed slide having a releasable stock clamp operable for clamping stock and thereafter advancing the clamped stock during a feed stroke in unison with movement of its feed slide from starting to advanced positions, a rotary crank mechanism mounted on the frame and drivingly connected to the feed slide, the crank mechanism being movable through a predetermined displacement in opposite angular directions precisely defining first and second crank throw limit positions terminating movement of the feed slide in opposite linear directions in said starting and advanced stroke limit positions, and a fluid operated, single acting power cylinder cooperating with the crank mechanism for driving the feed slide from its starting position to advanced stroke limit position, the power cylinder being deactivated during an idle return movement of the feed slide from advanced stroke limit position to its starting position under the driving force of its crank mechanism.

4,694,983

DEVICE FOR CONTROLLING PINCH ROLLER IN CASSETTE TAPE RECORDER

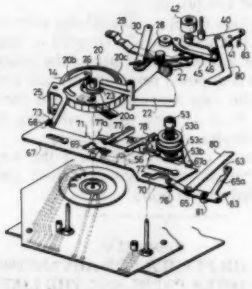
Shoji Suzuki, Iwaki, Japan, assignor to Alpine Electronics Inc., Japan

Filed Mar. 26, 1986, Ser. No. 844,174

Claims priority, application Japan, Mar. 26, 1985, 60-43753

Int. Cl.[4] B65H *20/40, 23/18;* **G11B** *15/29;* **G03B** *1/32*

U.S. Cl. 226—181 **2 Claims**



1. In a cassette tape recorder, a pinch roller controlling device comprising:

a chassis;

a pinch roller support plate and a control lever respectively pivotally attached with a first and a second support shaft on said chassis at respective intermediate portions of said pinch roller support plate and said control lever;

a capstan shaft supported on said chassis;

a pinch roller pivotally attached on said pinch roller support plate at one end portion thereof arranged to be movable to advance to/retreat from said capstan shaft;

an elongated guide hole formed in said pinch roller support plate at a portion between said one end portion of said pinch roller support plate and said first support shaft;

a control plate slidably mounted on said chassis at the side of said second support shaft and formed with a cam hole;

a driven pin projectingly provided on said control lever at one end portion thereof and inserted into said cam hole;

a connecting plate pivotally attached at one end portion thereof on said control lever at a portion between said one end portion of said control lever and said second support shaft;

an engaging pin projectingly provided on the other end portion of said connecting plate and inserted into said elongated guide hole; and

a roller urging spring stretched between the other end portion of said pinch roller support plate and the other end portion of said control lever.

4,694,984

AUTOMATIC RIVETING PRESS

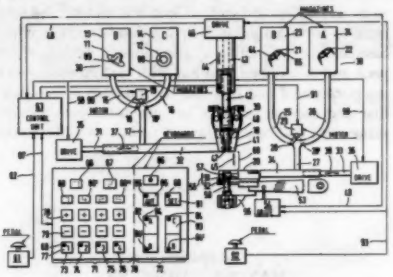
Gerhard H. J. Altwicker, Eschweiler, Fed. Rep. of Germany, assignor to William Prym-Werke GmbH. & Co. KG, Stolberg, Fed. Rep. of Germany

Filed Feb. 12, 1986, Ser. No. 828,833

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1985, 3508018

Int. Cl.[4] A41H *37/02*

U.S. Cl. 227—18 **19 Claims**



1. A cyclically operated machine for assembling complementary first and second articles of hardware at a single assembling station, particularly a riveting press for affixing first and second components of fasteners to garments and the like, comprising first and second applicatior means at said single station; a plurality of first sources for supplies of different types of first articles; a plurality of corresponding second sources for supplies of different types of second articles, each type of second articles being complementary to a particular type of first articles; article feeding means operable to deliver first and complementary second articles from said first and second sources to said first and second applicator means, respectively, comprising discrete first and second conveyors for each of said first and second sources, respectively, said first and second conveyors being respectively activatable to deliver first and second articles from the corresponding first and second sources; programmable signal transmitting control means for operating said feeding means so as to select, prior to each cycle, a discrete first and a discrete second conveyor for delivery of respective articles to the corresponding applicator means; and means for programming said control means, including first signal generating means for determining the sequence in which said feeding means is operated to deliver different types of first and complementary second articles from the respectively first and second sources, and second signal generating means for selecting the total number of first and second articles of each type to be delivered seriatim from the selected first and corresponding second sources.

4,694,985

METHOD OF PRODUCING TITANIUM CLAD STEEL PLATE BY HOT ROLLING

Chiaki Ouchi; Masakazu Niikura, both of Kanagawa, and Hiroyoshi Suenaga, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

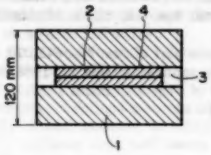
Filed Aug. 1, 1986, Ser. No. 892,576

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—235 **5 Claims**

1. A method of producing titanium clad steel by hot rolling, comprising forming a slab assembly with ferrous base materials and titanium cladding materials, coating at least one side of the cladding surfaces of said base materials and said titanium cladding materials with oxides of Mo or V in the amount of 20 to 300 g/m^2, evacuating the interior of said slab assembly to a

pressure of less than 10^{-1} Torr, heating at temperatures between the melting point of said oxide plus 50° C. and 1050° C.



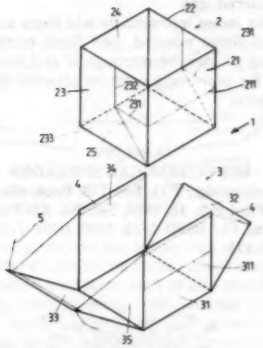
so as to reduce said oxide by the action of said titanium, and carrying out hot-rolling thereon.

4,694,986

DISPOSABLE CONTAINER

Lung-Chiao Chou, No. 1, Alley 9, Lane 250, Sec. 2, Cheng Kung Rd., Nei Hu, Taipei, Taiwan

Filed Aug. 15, 1986, Ser. No. 896,647
Int. Cl.[4] B65D *5/36*
U.S. Cl. 229—41 R **2 Claims**



1. A disposable container comprising:

an inner cup having a vertical front wall, a vertical rear wall, two vertical side walls and a bottom, said vertical front wall having a horizontal folding line at middle thereof, each of said vertical side walls having a horizontal folding line with one end connecting to the horizontal folding line of the vertical front wall and the other end connecting to center thereof, a vertical folding line extending from the center to an upper edge thereof, and two slanting folding lines extending from the center to respective lower corners thereof;

an outer cup having a bottom plate, a front flap, a rear flap and two side flaps, the flaps being integral with respective sides of the bottom plate, said flaps having an upper edge provided with a passage, said front flap having a horizontal folding line at middle thereof which coincides with the horizontal folding line of the vertical front wall of the inner cup, the inside surface of the front flap, the rear flap and the bottom plate of the outer cup being respectively adhered to outside surface of the vertical front wall, the vertical rear wall and the bottom of the inner cup;

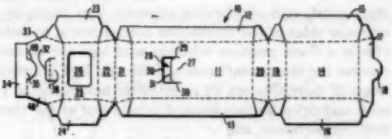
a pulling line in turn passing through the passages of one of the side flaps, the front flap, the other one of the side flaps, the rear flap, and the first one of the side flaps.

4,694,987

TWO COMPARTMENT CARRYOUT CARTON

Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.

Filed Nov. 19, 1986, Ser. No. 932,307
Int. Cl.[4] B65D *5/48*
U.S. Cl. 229—114 **5 Claims**



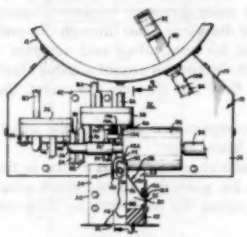
1. In a carton comprising a single tray and a pair of lid members, said tray having a bottom wall and trapezoidal shaped upstanding side walls with upper edges and said lid members having trapezoidal shaped, downwardly extending side walls, rear walls and front walls, one of said front walls being extended below the upper edges of the tray side walls into the tray to form a front wall ceiling, means for foldably attaching the rear walls of said lid members to opposed side walls of the tray, a flap element foldably connected along a fold line to the front wall extension of one of the lid members, and flap element having a free leading edge and a trailing edge defined by its foldable connection to the front wall extension, means for releasably connecting the front wall of one lid member to the front wall of the other lid member, and a locking means between the bottom wall of the tray and the flap element attached to said front wall extension, said locking means including a male locking tab integral with the flap element cut from the extended front wall material, and a female locking slot of substantially rectangular shape cut from the tray bottom wall material.

4,694,988

CONTROL INSTALLATION FOR VARIABLE VOLUME AIR DIFFUSERS

Melvin C. Carlson, Kansas City, Mo., and Raymond H. Dean, Shawnee Mission, Kans., assignors to Tempmaster Corporation, North Kansas City, Mo.

Division of Ser. No. 837,888, Mar. 10, 1986, Pat. No. 4,648,552.
This application Dec. 5, 1986, Ser. No. 938,430
Int. Cl.[4] F24F *7/06, 13/08*
U.S. Cl. 236—49 **2 Claims**



1. In a control system for an air diffuser having a plenum for directing conditioned air to the diffuser and a diffuser slot for discharging the air to a conditioned space, the improvement comprising:

a generally transverse bulkhead on said plenum and diffuser defining a control compartment and an underlying thermostat compartment arranged as extensions of the plenum and diffuser, respectively, said thermostat compartment having opposite sides and a slot arranged as an extension of the diffuser slot;

a thermostat having a housing containing a temperature sensitive sensing element included in the control system, said thermostat housing having a tube connection arranged to be coupled to a tube of the control system and said housing having an open bottom for accommodating flow of air from the conditioned space to the sensing elements;

a spring clip in the thermostat compartment for holding said thermostat, said clip having opposite legs engaging said opposite sides of the thermostat compartment to hold the clip in a fixed position wherein said legs are located to receive the thermostat housing with said legs gripping the housing therebetween to releaseably hold same in place with said open bottom located in said slot of the thermostat compartment; and

a foam insulating block in said thermostat compartment adjacent the slot thereof, said block having an opening sized to accept passage of the thermostat through said slot into and out of the thermostat compartment, said housing fitting closely in said opening of the block when the housing is inserted into said spring clip and ripped between said legs thereof.

4,694,989

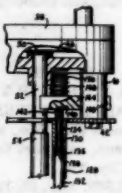
CONTROL INSTALLATION FOR VARIABLE VOLUME AIR DIFFUSERS

Melvin C. Carlson, Kansas City, Mo., and Raymond H. Dean, Shawnee Mission, Kans., assignors to Tempmaster Corporation, North Kansas City, Mo.

Division of Ser. No. 837,888, Mar. 10, 1986, Pat. No. 4,648,552. This application Dec. 5, 1986, Ser. No. 938,576

Int. Cl.[4] F24F *13/10*

U.S. Cl. 236—49 **14 Claims**



1. In an air distribution system having a duct for receiving conditioned air, an outlet for discharging air from the duct to a conditioned space, pressure responsive actuator means for controlling the discharge of air through the outlet, a pneumatic control circuit for controlling said actuator means, and an exhaust tube in the control circuit slidable axially to adjust the maximum air flow rate through the outlet, the improvement comprising:

a control compartment housing said control circuit and having a lower end;

means for mounting said exhaust tube in the control compartment for generally up and down axial sliding movement to adjust the maximum air flow rate through the outlet;

an elongate internally threaded sleeve secured in said control compartment at a fixed location offset from and generally parallel to the exhaust tube;

a bracket extending from said exhaust tube and having a seat surface aligned with said sleeve at a location above the sleeve; and

an elongate screw threaded through said sleeve and having a top end presenting a tip engaging said seat surface, said screw having a bottom end accessible through the lower end of said control compartment to effect turning of the screw to move the bracket and exhaust tube up and down for adjustment of the maximum air flow rate.

4,694,990

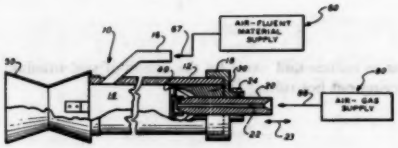
THERMAL SPRAY APPARATUS FOR COATING A SUBSTRATE WITH MOLTEN FLUENT MATERIAL

Axel T. Karlsson, 94 Townsend Dr., Middletown, N.J. 07748, and Mille Stand, Apt. 4A, 117 S. Highland Ave., Ossining, N.Y. 10562

Continuation-in-part of Ser. No. 648,070, Sep. 7, 1984, abandoned. This application Jan. 13, 1986, Ser. No. 818,182

Int. Cl.[4] B05B *1/24*

U.S. Cl. 239—81 **11 Claims**



1. Thermal spray apparatus for providing a stream of molten heat fusible fluent material for coating a substrate, comprising:

heat source means including a flame for producing a stream of heated gas heated to sufficiently high temperature to melt said material;

material advancing means for advancing a stream of heat fusible fluent material into said stream of heated gas to melt said material and produce said stream of molten fluent material; and

flame barrier means intermediate said flame and said stream of molten fluent material, said flame barrier means for permitting passage therethrough of said stream of heated gas and for preventing reaction between said flame and said material.

4,694,991

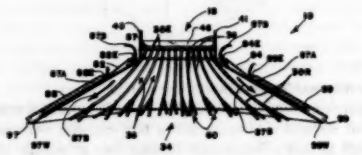
AGRI-CHEMICAL SPREADER

Virgil H. Breckenridge, P.O. Box 178, Beedeville, Ark. 72014

Filed Feb. 18, 1986, Ser. No. 829,915

Int. Cl.[4] B64D *1/18, 1/00*; B05B *1/20*

U.S. Cl. 239—171 **8 Claims**



6. In an agri-chemical spreader device adapted to be coupled to agricultural spray planes or the like for uniformly widely broadcasting a agri-chemical over a selected field, the spreader being of the type comprising a generally V-shaped main body portion having a central section, a top and a spaced-apart bottom, the top and bottom originating at the mouth of an input throat of a predetermined height and width, and the top and bottom rearwardly diverging to a larger width rear output end with a reduced height wherein said mouth is defined between a pair of angled side plates, an upper sprayer mounting plate, and a lower, forward facing angularly adjustable baffle plate adapted to be selectively adjusted for varying the intake rate of air into said spreader main body portion, a plurality of internal spaced apart, acruate vanes extending between said top and bottom of said main body having fronts secured in closely spaced apart relation within said mouth and terminating in farther spaced apart ends at said output end, the improvement comprising:

a plurality of angularly adjustable swallow tails operatively

associated with each of said vanes at the terminal ends thereof for distributing said agri-chemical, said swallow tails each comprising a pair of cooperating tabs pivotally coupled at the rear of each of said vanes, each of said tabs being pivotally deflectable relative to the other, whereby the tabs can be adjusted to either;

a position to the left or the right relative to said vanes to compensate for prop (P)-Factor;

a substantially open V shaped position to variably occlude the air passageways defined between adjacent vanes; or;

a substantially closed position in which both tabs are substantially coplanar with said vanes; and,

whereby said spreader is adapted to compensate for uneven wind effects caused by such factors as prop rotation, prop (P)-Factor, aircraft design, and the presence of aircraft component parts such as landing gears, wing struts, oil coolers and the like.

4,694,992

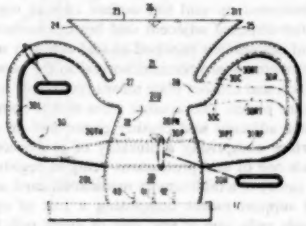
NOVEL INERTANCE LOOP CONSTRUCTION FOR AIR SWEEP FLUIDIC OSCILLATOR

Ronald D. Stouffer, Silver Spring, Md., assignor to Bowles Fluidics Corporation, Columbia, Md.

Filed Jun. 24, 1985, Ser. No. 748,065

Int. Cl.[4] B63H *25/46*

U.S. Cl. 239—265.23 **6 Claims**



1. Continuous inertance loop connectable at its ends to a pair of control ports of a fluidic oscillator, comprising,

a pair of matching sections, each of said matching sections having gradually varying cross-sectional areas for coupling the respective ends of said loop to said control ports, said matching section being of largest cross-sectional area at said control port, and of smaller cross-sectional area at the opposite end thereof,

a pair of loop sections of uniform cross-sectional area substantially equal to the cross-sectional area of the said smaller cross-sectional area of the said opposite end of said matching section, each respective said loop section being connected at one end to said opposite end of its matching section,

a pair of transition sections each having cross-sectional area substantially equal to the cross-sectional area of said loop sections of uniform cross-sectional area, and

a common section having a substantially flat and elongated cross-sectional area and coupled between the respective ends of said transition sections.

4,694,993

CRUSHING AND WASHING PROCESSING APPARTUS FOR BALLAST AND SAND

Shigeharu Endo, and Kazuma Endo, both of 22-3, Motoshiro-cho, Fujinomiya-shi, Shizuoka-ken, Japan

Filed Sep. 30, 1985, Ser. No. 782,288

Int. Cl.[4] B02C *19/22*

U.S. Cl. 241—46.11 **5 Claims**

1. A crushing and washing apparatus for ballast and sand comprising:

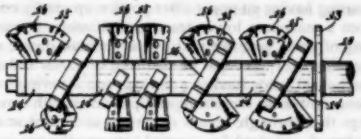
a cylindrical barrel formed at one end with a feed port for the introduction of ballast and sand, and at the other end with a discharge port;

at least one water filling port between said feed and discharge ports;

a rotary shaft within said barrel extending from said feed port to a point adjacent said discharge port;

at least a sleeve having agitating wings thereon mounted on said rotary shaft; and

back pressure control means connected with said discharge



port for selectively varying the back pressure applied to the ballast and sand to control the amount of time the ballast and sand are subjected to said agitating wings,

said back pressure control means comprising a rotary crushing bowl longitudinally movable into and out of said discharge port;

and a rotary shaft supporting said crushing bowl, a bearing slideably supporting said shaft, and pressure means adjacent the end of said shaft for applying a preselected pressure to the end of said shaft.

4,694,994

ROLLER MILL

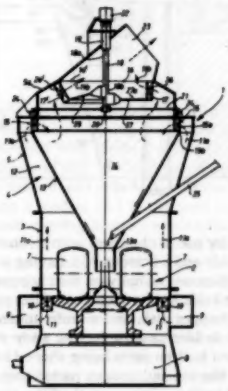
Heinrich Henne, Ennigerloh; Gotthardt Blasczyk; Hubert Eickholt, both of Beckum, and Ludger Lohnherr, Oelde, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Beckum, Fed. Rep. of Germany

Filed Jul. 29, 1985, Ser. No. 759,836

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1984, 8425837[U]

Int. Cl.[4] B02C *15/00, 23/32*

U.S. Cl. 241—79.1 **14 Claims**



1. A roller mill comprising a housing having air inlet means at its lower end and air exhaust means at its upper end; a grinding member within said housing; grinding rollers in rotary engagement with said grinding member for comminuting material, said air inlet means and said air exhaust means being operable to establish an upwardly flowing air stream for entraining comminuted material; a conical hopper within said housing defining with the latter an air passage for said air

stream and material entrained therein, said hopper forming a sifting chamber inwardly of said air passage having an outlet at its lower end for discharging material to said grinding member, said sifting chamber being in communication at its upper end with said air exhaust means; a ring of guide vanes at the upper end of said sifting chamber, means for deflecting said air stream and material entrained therein from said air passage through said ring of guide vanes transversely inwardly into said sifting chamber to effect a first separation of material entrained in said air stream, said ring of vanes having a diameter corresponding substantially to that of the upper end of said sifting chamber, said housing having an upper sifter portion upwardly converging from a maximum lower transverse diameter inwardly of said ring of guide vanes to an upper air exhaust outlet; a rotor of lesser diameter than that of said ring of vanes and coaxial therewith, said rotor having a bottom and a peripheral wall extending upwardly therefrom and provided with transverse openings therethrough; means mounting said rotor at a level above that of said ring of vanes and between the upper end of said sifting chamber and said air exhaust means; the maximum outer diameter of said rotor being less than the minimum inner diameter of said ring of vanes to provide an annular space therebetween, and the converging upper sifter housing portion extending closely adjacent the upper end of the peripheral wall of said rotor about its circumference, whereby the air stream charged with fine material can be reliably delivered to the outer peripheral openings of said rotor so that all air passing from said sifting chamber flows through the openings of said rotor to effect a second separation of material entrained in said air stream; and drive means for rotating said rotor.

4,694,995

DEVICE IN CONNECTION WITH CHOPPERS

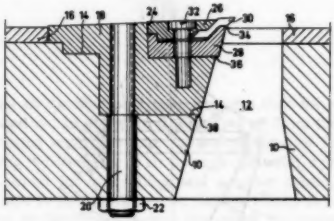
Erne L. Holmberg, Hudiksvall, and Torbjorn C. Andersson, Forsa, both of Sweden, assignors to Aktiebolaget Iggesunds Bruk, Iggesund, Sweden

Continuation of Ser. No. 717,584, Mar. 29, 1985, abandoned. This application Dec. 3, 1986, Ser. No. 937,434

Claims priority, application Sweden, Apr. 21, 1982, 8202509

Int. Cl.[4] B02C *18/18*

U.S. Cl. 241—92 **9 Claims**



1. A device for use in choppers with a rotating chopper disk that has a top side and a bottom side, having a knife attached to a knife holder disposed radially on the chopper disk, characterized in that the knife holder includes a filler piece fitting into a recess in the chopper disk, and a knife holder cassette for the knife, the knife holder cassette having a top part and a bottom part, the top and bottom parts being shaped to clamp the knife therebetween, the top and bottom parts being selectively separable to permit knife replacement, the filler piece incorporating a mounting for the knife holder cassette, the cassette being attached to the filler piece by means of a first fastener inserted from the top side of the chopper disk, the first fastener abutting the top part of the knife holder cassette and clamping the knife in place, the filler piece being held fast in the recess in the chopper disk by means of a second fastener, the first fastener being threaded only into the filler piece and not extending through the filler piece into the chopper disk to clamp the knife in place and secure the cassette to the filler piece.

4,694,996

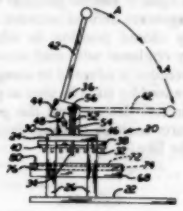
MULTI CAVITY MEDICATION CARD CRUSHER

Harold B. Siegel, Clearwater, Fla., assignor to Siegel Family Revocable Trust, Clearwater, Fla.

Filed Oct. 20, 1986, Ser. No. 920,678

Int. Cl.[4] B02C *1/00*

U.S. Cl. 241—100 **9 Claims**



1. An apparatus for crushing multi cavity medication cards, said apparatus comprising: frame means comprising a pair of oppositely disposed base plates, a top plate, and a plurality of legs disposed in interconnecting relation between said top plate and said base plates, said top plate further comprising a top surface and a bottom surface; a crusher means mounted on said top plate, said crusher means comprising crusher platen actuator means mounted on said top surface of said top plate, a crusher platen disposed adjacent said bottom surface of said top plate and operatively attached to said actuator means for reciprocal movement in directions normal to the plane of said bottom surface, and crusher plate means removably attachable to said crusher platen, said crusher plate means comprising a planar surface adjacent said crusher platen and an opposite, exposed surface comprising a plurality of protrusions found thereon, each one of said protrusions being in registry with a medication cavity of a multi cavity medication card; and medication card support means comprising a pair of oppositely disposed guide rails, one of said pair of guide rails being attached in spaced above, substantially parallel relation to a corresponding one of said base plates, each of said guide rails comprising an upper guide track and a lower guide track formed thereon, whereby a multi cavity medication card may be inserted into said card support means and may be crushed by the action of said crusher means to render the card useless.

4,694,997

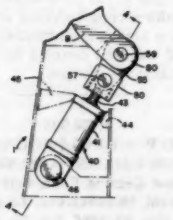
APPARATUS FOR EXERTING A DOWNWARD FORCE ON A GRINDING ROLLER

Bernard H. Schonbach, Allentown, Pa., assignor to Fuller Company, Bethlehem, Pa.

Filed Dec. 12, 1985, Ser. No. 808,324

Int. Cl.[4] B02C *15/00*

U.S. Cl. 241—117 **4 Claims**



1. In a roller mill for comminuting solid material including a generally horizontal grinding table mounted for rotation about its own axis, at least one grinding roller mounted at an angle to

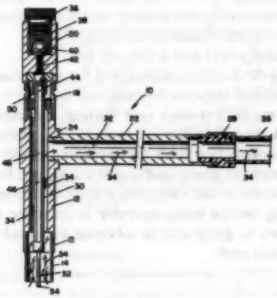
the grinding table for rotation about its own axis for cooperation with the grinding table for comminuting material between the grinding table and the grinding roller, a rocker arm mounted for pivotal movement relative to said grinding table, said grinding roller being mounted on one end of said rocker arm, an improved apparatus for exerting a downward force on the grinding roller comprising piston-cylinder means including a piston and an upwardly extending shaft, a link element pivotally connected at its one end to said shaft and pivotally connected at its other end to the other end of said rocker arm whereby downward movement of said piston causes said rocker arm to pivot and exert downward force on the grinding roller.

4,694,998

VACUUM ASSEMBLY FOR WIRE UNWRAPPER

Donald L. McKinney, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 26, 1985, Ser. No. 780,174
Int. Cl.[4] B65H *81/00*
U.S. Cl. 242—1 **7 Claims**



5. A vacuum assembly for vacuuming around an electrical post while unwrapping wire from the electrical post with a wire wrap removal tool, the tool having two ends, a first end adapted for engaging the wire wrapped around the electrical post, the vacuum assembly comprising:

a hollow housing for receiving the removal tool therein, one end of the housing being flexible for receipt around one or more electrical posts when the first end of the removal tool engages the wire, the second end of the removal tool being rotatably attached inside the other end of the housing using a tool connecting means for rotating the removal tool therein in order to unwrap the wire from the electrical post; and

vacuum means communicating with the housing for drawing a vacuum in the housing and around the tool as the tool unwraps the wire.

4,694,999

TOROIDAL WINDING APPARATUS

Masahiro Ishida; Shunichi Kato, and Noboru Takasu, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 633,888, Jul. 24, 1984, Pat. No. 4,568,032. This application Nov. 14, 1985, Ser. No. 798,025
Claims priority, application Japan, Jul. 26, 1983, 58-135176; Aug. 23, 1983, 58-152436; Sep. 17, 1983, 58-170598; Oct. 19, 1983, 58-194032; Oct. 25, 1983, 58-199484; Oct. 31, 1983, 58-203836; May 8, 1984, 59-91224; May 8, 1984, 59-91225; May 8, 1984, 59-91226
Int. Cl.[4] H01F *41/08*
U.S. Cl. 242—4 R **24 Claims**

1. An apparatus for winding a wire on an object having a through hole by passing the wire through the through hole, comprising:

a base;

holding means, arranged on the base, for holding the object;

wire supply means for supplying the wire through the through hole from one end of the through hole of the object held by the holding means;

first wire feeding means, arranged at said one end side of the through hole of the object held by the holding means, for clamping the wire and for feeding the clamped wire through the through hole from said one end thereof;

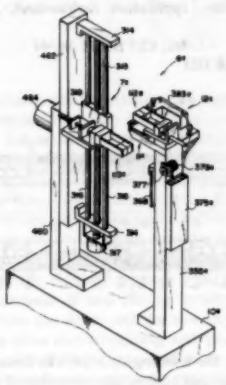
first means for moving the wire feeding means toward and away from the holding means;

second wire feeding means for clamping at the other end side of the through hole the wire supplied through the through hole from said one end thereof and for feeding the clamped wire to the through hole from said one end side thereof;

second means for moving the second feeding means between a first position at the other end side of the through hole and a second position at said one end side of the through hole and between a front position adjacent to the object and a rear position separated from the object,

means for rotating said second wire feeding means about an axis perpendicular to the axis of the through hole; and

drive means for



causing the supply means to supply the wire from said one end of the through hole, causing the second moving means to move the second wire feeding means to the first position at the other end side of the through hole and to the front position thereof, and driving the second wire feeding means to clamp a leading end of the wire supplied;

causing the second moving means to move the second wire feeding means to the rear position thereof so as to suspend the wire between the object and the second wire feeding means, causing the first moving means to move the first wire feeding means to a position in the vicinity of the object, and causing the second moving means to move the second wire feeding means to the second position thereof so as to wind the wire around the object;

causing the rotating means to pivot the second wire feeding means to direct the leading end of the wire toward the object and causing the second moving means to move the second wire feeding means to the front position thereof in the vicinity of the first wire feeding means;

causing the second wire feeding means to feed the wire and clamping the leading end of the fed wire by the first wire feeding means;

causing the second moving means to move the second wire feeding means to the first position and the front position thereof, thereafter causing the first feeding means to feed

the wire through the through hole from said one end thereof, causing the second wire feeding means to clamp the fed wire at the other end of the through hole, causing the first moving means to move the first wire feeding means away from the object, and causing the second moving means to move the second wire feeding means to the rear position thereof to wind the wire around the object; and

thereafter continuously operating the apparatus in the above sequential steps.

4,695,000

DEVICE FOR WINDING-UP A THREAD

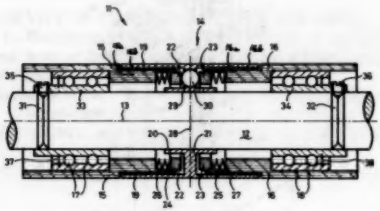
Walter Fretz, Freienstein, and Walter Hefti, Ettenhausen, both of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Jan. 28, 1987, Ser. No. 7,579

Claims priority, application Switzerland, Jan. 29, 1986, 00343/86

Int. Cl.⁴ B65H *54/46*

U.S. Cl. 242—18 DD **12 Claims**



1. In a device for winding-up a yarn to form a yarn package on a rotatable conical bobbin tube by means of a rotatable drive roller, comprising:

a common drive shaft;

substantially cylindrical rotational elements arranged axially adjacent one another on said common drive shaft;

said substantially cylindrical rotational elements defining a central rotational element and two lateral rotational elements;

said central rotational element having oppositely situated ends;

said central rotational element being fixedly secured to the drive shaft;

a given one of said two lateral rotational elements being arranged at each end of the central rotational element;

a rotational bearing provided for each lateral rotational element for mounting each said lateral rotational element upon said drive shaft;

said rotational elements being capable of engaging with the bobbin tube or yarn package being formed thereon along a generatrix for rolling engagement therewith during a yarn wind-up operation;

a differential transmission for operatively interconnecting said lateral rotational elements; and

said differential transmission serving for operatively interconnecting said lateral rotational elements comprises a friction coupling.

4,695,001

MEANS FOR CUTTING TO LENGTH AND WINDING WINDING MATERIAL

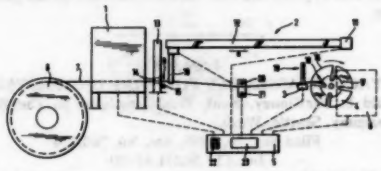
Anton Dreher, and Josef Gramer, both of Horb, Fed. Rep. of Germany, assignors to Hans Deissenberger, Horb am Neckar, Fed. Rep. of Germany

Filed Sep. 26, 1985, Ser. No. 780,444

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1984, 3438212

Int. Cl.⁴ B65H *54/02*

U.S. Cl. 242—25 R **7 Claims**



1. In a winding and reeling apparatus for strand material including a measuring and cutting unit for feeding said strand material, the improvement comprising:

a strand supply reel and a take-up reel;

a threading device for grasping and for advancing a lead end of said strand material toward said take-up reel;

centering means between said cutting and measuring unit and said threading device operable to position said lead end for connection with the threading device, and;

sensing means adjacent said centering means for indicating the presence in said centering means of said lead end, said threading device being operable in response to said sensing means to grasp and to advance said lead end toward said supply reel.

4,695,002

DRIVEN THREAD STORAGE DEVICE

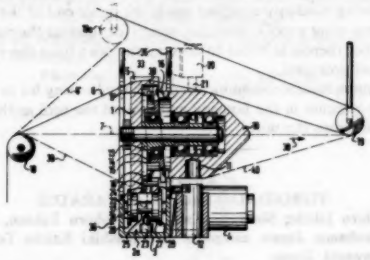
Hans Raasch, Moenchengladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany

Filed May 7, 1986, Ser. No. 860,676

Claims priority, application Fed. Rep. of Germany, May 8, 1985, 3516457

Int. Cl.⁴ B65H *51/20*

U.S. Cl. 242—47.01 **14 Claims**



1. Driven thread storage device for compensating instantaneous differences between thread feeding and withdrawal velocities in a textile machine, comprising means for axially feeding thread at a feeding locations, means for axially withdrawing thread at a withdrawal location, a stationary storage drum, a driven thread guide in the form of a rotation-symmetrical disc conducting the thread to said storage drum and producing a thread ballon at said feeding location, said disc having

an edge with at least one radially open thread guide slot formed therein, a drive for said disc, means disposed outside said thread balloon for supporting said disc, said supporting means including a friction drive contacting said edge of said disc and being connected to said drive, a machine frame, means for spatially fixing the position of said storage drum with magnetic forces, said position fixing means including an element fixed at said machine frame and an element disposed at said storage drum, at least one of said elements being a magnet, a thread holding device attached to said machine frame, and means for moving said thread holding device toward said storage drum for blocking traversing motion of the thread around said storage drum at said withdrawal location whether or not said disc is operating.

4,695,003

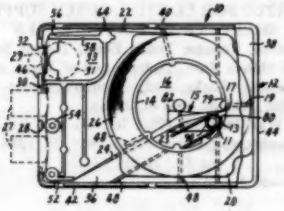
SELF ADJUSTING ENDLESS LOOP TAPE CARTRIDGE

Alfred H. Moris, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jun. 23, 1986, Ser. No. 877,374

Int. Cl.[4] G11B *23/07*

U.S. Cl. 242—55.19 A **1 Claim**



1. A cartridge comprising:

a housing adapted to be received in a machine and having access openings adapted to receive heads and a tape drive mechanism in said machine;

a cylindrical hub attached to said housing at a position spaced from said access openings, said hub having a central opening and a slot extending axially across the full width of the hub and communicating with said central opening; and

an endless length of tape having a major portion wrapped about said hub to form a coil and a minor portion extending from the innermost wrap of the coil through said slot into said central opening, and around the side surface of the coil to the outermost wrap of the coil;

said hub comprises a flexible cantilevered portion having a first end partially defining said slot, having a second end spaced from said first end that is fixed on said housing, and being separated from said housing between said first and second ends;

said cartridge comprises a cam rotatably mounted about an axis on said housing and having a peripheral surface contacting the inner side of said cantilevered hub portion to provide means for changing the position of said cantilevered portion radially of said hub to adjust the effective circumference of the hub and thereby the length of said minor portion; and

means on said housing for defining a tape path for and producing tension in said minor portion, comprising means for guiding said minor portion past said access openings in a predetermined position for engagement by the heads and drive mechanism of the playback machine, and a guide pin helping to guide said minor portion at a position adjacent the slot, said guide pin being fixed to said cam for pivotal movement about the axis of said cam between a first position providing a first path length for said minor portion at which said cam provides a first maximum effective circumference for said hub and a second position providing a second path length shorter than said first path length for said minor portion at which the cam provides a second minimum circumference for said hub, and means for biasing said guide pin toward said first position.

4,695,004

METHOD FOR TRANSFERRING A WEB FROM A FINISHED ROLL TO A NEW CORE, AND DRUM WINDER FOR THE APPLICATION OF THE METHOD

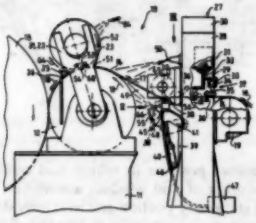
Udo Grossmann, Heidenheim; Dieter Holzinger, Herbrechtingen, and Guenter Rohde, Zang, all of Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Oct. 23, 1985, Ser. No. 790,341

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515519

Int. Cl.[4] B65H *19/26*

U.S. Cl. 242—56 R **11 Claims**



5. In a drum winder for the transfer of a continuously arriving web from a finished product roll onto a new core having a powered drum looped by the web, a finished product roll bearing on the powered drum and the new core rotating in the direction of web travel and positioned before the product roll, the drum winder comprising: cutting means positioned before the powered drum for cutting the web longitudinally for forming a transfer strip prior to running onto the drum but leaving the transfer strip attached to the portion of the advancing web to be wound on the finished product roll, severing means, positioned downstream of said cutting means and before the intake gap between the drum and the new core, for severing the transfer strip from said advancing web portion before the transfer strip reaches the new core, and guide means for guiding the severed transfer strip onto the new core, said cutting means including the means for completely severing the web after the severed transfer strip is guided onto the new core.

4,695,005

CORELESS WINDER FOR STRIPS OF PLIABLE MATERIAL

Peter J. Gietman, Jr., Combined Locks, Wis., assignor to Custom Machinery Design, Inc., Appleton, Wis.

Filed May 13, 1985, Ser. No. 733,045

Int. Cl.[4] B65H *18/10, 19/26, 75/24*

U.S. Cl. 242—56 R **12 Claims**

1. A winder for winding elongate strips of pliable material, such as plastic film, cloth or paper, into coreless rolls, said winder including:

cut-off means for forming strips of pliable material of a preselected length;

conveyor means for conveying said strips of pliable material from said cut-off means;

at least two winding assembly means for winding said strips of pliable material into coreless rolls;

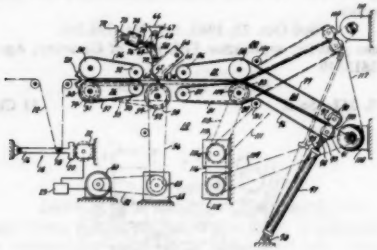
said conveyor means consisting of a first extended stationary portion, immediately adjacent said cut-off means and having top and bottom conveying surfaces forming a nip for accepting a leading edge of said strip of pliable material from said cut-off means, and a second movable portion

for alternately directing said stips of pliable material to different ones of said winding assembly means;

means for driving said conveyor means;

means for driving said winding assemblies

wherein said movable portion of said conveyor means comprises an outlet formed by the ends of said top and bottom conveying surfaces, said winder including a first cylinder means having an extensible piston rod means, said rod means being coupled to said conveyor outlet for moving said outlet from a first position in which said outlet is disposed adjacent a first one of said winding assemblies to



at least another position in which said outlet is located adjacent another of said winding assemblies

wherein said stationary portion and said movable portion of said conveyor means comprise a plurality of pairs of roller means spaced between said cut-off means and said outlet, said pairs of roller means including a top roller and a bottom roller, single endless means surrounding the top rollers to provide a top conveyor surface and single endless means surrounding the bottom rollers to provide a bottom conveyor surface, whereby pliable material passing into said nip and between said conveyor surfaces is conveyed through said conveyor means.

4,695,006

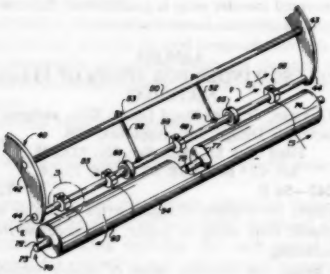
PAPER CONVERTING MACHINE

Daniel L. Pool, Paradise Valley, Ariz., assignor to Minnesota Mining and Manufacturing, St. Paul, Minn.

Filed Aug. 12, 1985, Ser. No. 764,396

Int. Cl.[4] B65H *35/02*

U.S. Cl. 242—56.3 **37 Claims**



1. A slitter mechanism for use in a paper converting machine which converts a roll of bulk coiled sheet paper into a plurality of specialty rolls of paper, said machine being of the type which includes a frame, a shaft coupled to the frame and supporting said roll of bulk coiled sheet paper for rotation about a first axis, a driven roller, an idler roller, and a mandrel positioned for rotation in a cradle formed by said driven roller and said idler roller for receiving a plurality of pre-cut specialty cores positioned in end-to-end abutment relationship upon which paper cut from said roll of bulk coiled sheet paper is wound in widths corresponding to the length of each of said specialty cores, said slitter mechanism comprising:

a pair of spaced apart arms having first and second ends;

an elongate support bar coupled between said spaced apart arms, said support bar having first and second ends, the second ends of said spaced apart arms being coupled to said frame;

a plurality of slitter assemblies slideably mounted on said support bar and capable of being selectively positioned thereon at locations corresponding to the desired lengths of said specialty rolls for cutting said bulk coiled sheet paper into said widths as said bulk coiled sheet paper is rolled onto said specialty cores;

a reinforcing bar extending between and carried by said pair of spaced apart arms at a location apart from said support bar and intermediate the first and second ends of said spaced apart arms; and

a plurality of spaced apart trusses each having a selectively adjustable length extending between and threadably engaging said support bar and said reinforcing bar.

4,695,007

APPARATUS FOR CONTINUOUSLY SUPPLYING SHEETS FROM SUPPLY ROLLS

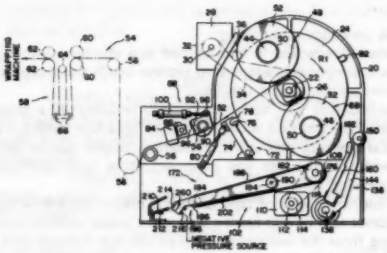
Yoshiyuki Muto, Yonago; Tadao Etani, Tokyo; Satoru Aida, Sanjo, and Shinya Kato, Tsubame, all of Japan, assignors to Sanjo Machine Works, Ltd., Manimakanbara and Japan Tobacco, Inc., Tokyo, both of, Japan

Filed Nov. 25, 1986, Ser. No. 934,721

Claims priority, application Japan, Nov. 28, 1985, 60-268094

Int. Cl.[4] B65H *19/16*

U.S. Cl. 242—58.4 **6 Claims**



1. An apparatus for continuously supplying sheets from supply rolls, comprising:

a rotary disc vertically disposed such that a central axis thereof extends in a horizontal direction, the rotary disc being rotatable about the central axis;

a first supply roll mounted at a peripheral portion of the rotary disc and including a roll of sheet material, the first supply roll having a first axis parallel to the central axis of the rotary disc, the first supply roll being rotatable about the first axis;

means for feeding the sheet from the first supply roll, the feeding means having a sheet feeding path;

a second supply roll mounted at a peripheral portion of the rotary disc and including a roll of sheet material, the second supply roll having a second axis parallel to the central axis of the rotary disc and being rotatable about the second axis, the second supply roll being provided with an adhesive tape for partially fixing a distal end of the sheet to an outer surface of the second supply roll;

a cutting/feeding device, located near the rotary disc, for cutting the adhesive tape of the second supply roll and feeding the sheet therefrom, the cutting/feeding device including driving means for reversibly rotating the second

supply roll, knife means provided with a knife to come into contact with or to be separated from an outer surface of the second supply roll, and actuating means for moving the knife along a direction parallel to the second axis of the second supply roll when the knife of the knife means is inserted under the distal end of the sheet of the second supply roll, the knife being adapted to be inserted under a portion excluding a region of the distal end of the sheet of the second supply roll upon driving of the second supply roll by the driving means, the region being fixed to the outer surface of the second supply roll by means of the adhesive tape, whereby the adhesive tape of the second supply roll is cut upon cooperation of the knife and the actuating means and, thereafter, the sheet of the second supply roll is fed therefrom upon rotation of the second supply roll by the driving means;

guiding means for guiding the sheet fed from the second supply roll and hence the distal end thereof to a predetermined connection position in the feed path of the feeding means;

adhering means for adhering the sheet from the first supply roll to the distal end of the sheet from the second supply roll at the connection position; and

cutting means, disposed in the feed path between the connection position and the first supply roll, for cutting the sheet fed from the first supply roll.

4,695,008

REELING MANDREL FOR WINDING METAL STRIPS

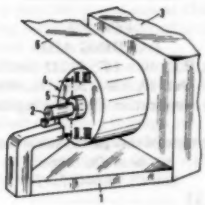
Henry Dabrowski, In der Meer 22a, 4005 Meerbusch 1, Fed. Rep. of Germany

Filed Aug. 14, 1985, Ser. No. 765,499

Claims priority, application Fed. Rep. of Germany, Sep. 7, 1984, 3432876

Int. Cl.⁴ B65H *18/04, 75/18*

U.S. Cl. 242—68.5 **16 Claims**



1. A reeling installation for winding metal strips with a drivable reeling mandrel, comprising:

an exchangeable lining of elastomer material mounted on said reeling mandrel, said lining of elastomer material being hard and flexible in the inner region as far as the inner surface of the lining, and soft and flexible in the outer region as far as the outer surface of the lining;

wherein the elastomer material of the inner region is sufficiently flexible to allow said lining to be useable on a reeling mandrel of the spreadable type.

4,695,009

BAIT ALERT FOR SPIN CAST REEL

Steven L. Swisher, Tulsa, Okla., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 1, 1986, Ser. No. 858,031

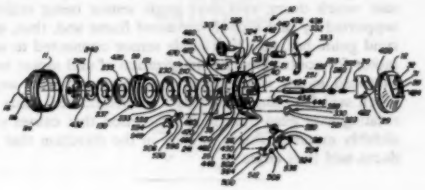
Int. Cl.⁴ A01K *89/00, 89/01*

U.S. Cl. 242—84.1 R **9 Claims**

1. In a fishing reel of the type having a spool for storing a supply of line and a crank handle operable through a drive train to direct line onto the spool, said drive train having a first member rotatable in a first direction with the crank handle operated to direct line onto the spool and rotatable oppositely to the first direction in response to the line being drawn off the spool, an improved bait alert comprising:

a clicker;

means mounting the clicker on the reel movably between a first position wherein a portion of the clicker contacts the first member and produces an audible clicking sound upon the first member being rotated and a second position wherein the portion of the clicker is spaced from the first member so that no clicking noise is generated between the portion of the clicker and first member upon the first member being rotated in the first direction; and



actuator means for moving the clicker to its second position upon the first member rotating in the first direction and for moving the clicker to its first position upon the first member rotating oppositely to the first direction,

whereby the user of the reel is alerted by the clicking noise to the fact that line is being drawn off of the reel as by a fish and upon the user retrieving line through operation of the crank handle the clicking noise is automatically stopped.

4,695,010

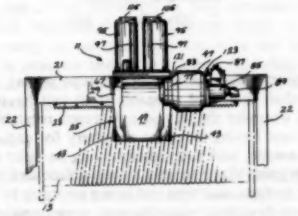
LEVELWIND MECHANISM

Glenn S. Smith, Issaquah, Wash., assignor to Beebe International, Inc., Seattle, Wash.

Filed Jun. 12, 1986, Ser. No. 873,506

Int. Cl.⁴ B65H *54/28*

U.S. Cl. 242—158 R **11 Claims**



1. A levelwind mechanism for controlling the fleet angle of a cable as the cable is spooled onto a winch drum comprising:

a winch frame having sidewalls at the ends of said winch drum for rotatably supporting the winch drum;

a rigid guide bar rigidly attached to said sidewalls of said winch frame so as to lie parallel to the axis of rotation of said winch drum;

an elongate rack mounted on said rigid guide bar;

a frame slidably mounted on said rigid guide bar for movement along the guide bar, said slidably mounted frame being entirely supported by said rigid guide bar;

a motor mounted on said slidably mounted frame, said motor being entirely supported by said slidably mounted frame and, thus, said rigid guide bar;

a gear train mounted on said slidably mounted frame for coupling said motor to said rack, said gear train being entirely supported by said slidably mounted frame and,

thus, said rigid guide bar, said gear train including: (i) a worm directly connected to the shaft of said motor; (ii) a shaft; (iii) a worm gear mounted on said shaft so as to engage said worm; and, (iv) a pinion gear mounted on said shaft and positioned to engage said rack;

cable guide rollers mounted on said slidably mounted frame through which cable passes as cable is spooled onto said winch drum, said cable guide rollers being entirely supported by said slidably mounted frame and, thus, said rigid guide bar; and,

a fleet angle sensor mounted on said slidably mounted frame on the winch drum side of said cable guide rollers for sensing the fleet angle of cable as cable is spooled onto said winch drum, said fleet angle sensor being entirely supported by said slidably mounted frame and, thus, said rigid guide bar, said fleet angle sensor connected to said motor for controlling the energization of said motor such that said motor is energized to reduce said fleet angle when said fleet angle exceeds a predetermined value by rotating said gear train in the direction that causes said slidably mounted frame to slide in the direction that reduces said fleet angle.

4,695,011

CASSETTE TAPE MACHINE

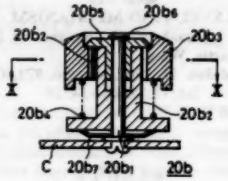
Masahiro Komatsubara; Tetsuro Kamimura; Takugi Inanaga, and Akira Takahashi, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 22, 1981, Ser. No. 333,510

Claims priority, application Japan, Dec. 26, 1980, 55-186647[U]; Dec. 26, 1980, 55-186648[U]; Dec. 26, 1980, 55-186649[U]; Dec. 26, 1980, 55-186651[U]

Int. Cl.⁴ G11B *15/32*

U.S. Cl. 242—199 **9 Claims**



1. A cassette tape machine of the type having at least one rotatable shaft unit, said rotatable shaft unit having an outer surface of irregular shape, and hub means rotatable with said shaft unit and having an outer periphery for engaging a tape reel in a cassette, said hub means having an inner surface of a mating irregular shape to said outer surface and surrounding said outer surface, said tape reel being rotatable in tape supply and take-up directions whereby said means rotates said shaft unit in said supply direction, the improvement comprising: resilient coupling means for resiliently coupling the rotational force of said hub to said shaft unit when said hub rotates in said supply direction, said resilient coupling means including at least one resilient member disposed between said inner and outer surfaces and biased outwardly from said shaft unit against said inner surface.

4,695,012

AERIAL LOAD-LIFTING SYSTEM

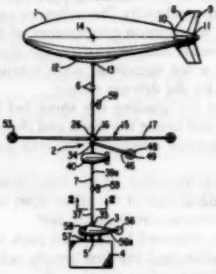
Bernard Lindenbaum, 4929 Thorain Ct., Dayton, Ohio 45416

Division of Ser. No. 502,324, Jun. 8, 1983, Pat. No. 4,601,444. This application Mar. 20, 1985, Ser. No. 714,123

Int. Cl.⁴ B64B *1/34*

U.S. Cl. 244—26 **31 Claims**

1. An aerial load-lifting system having a plurality of aircraft units, one of said units comprising a lighter-than-air aircraft for lift and another unit comprising a powered heavier-than-air aircraft for lift and maneuvering including controls using motion sensing inputs into an autopilot, a flexible tension member including an upper cable adapted for angle changes interconnecting said units, and means on said heavier-than-air aircraft connected to said tension member for allowing said heavier-than-air aircraft to bodily tilt through large angles in and azimuthal direction and to cause the tension force in said tension member to act approximately through a prescribed point with respect to said heavier-than-air aircraft for any angle between



said tension member and said heavier-than-air aircraft during operation, said lighter-than-air aircraft being located substantially above said heavier-than-air aircraft suspended therefrom and cooperating therewith to permit swinging motion damped maneuvering of said heavier-than-air aircraft with a minimum of influence by any motions of said lighter-than-air aircraft such that the autopilot is used to stabilize position of the heavier-than-air aircraft and a suspended load regardless of motions of the lighter-than-air aircraft above and the upper cable angle changes produced by such motions.

4,695,013

LANDING AID

Ulrich Trampnau, P.O. Box 167, 21211 Jeddah, Saudi Arabia

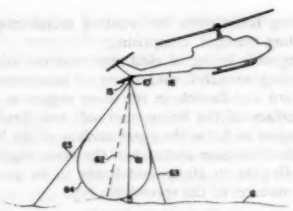
Filed Oct. 10, 1984, Ser. No. 659,358

Claims priority, application United Kingdom, Oct. 17, 1983, 8327731

The portion of the term of this patent subsequent to Jul. 9, 2002, has been disclaimed.

Int. Cl.⁴ B64C *13/16*

U.S. Cl. 244—17.13 **10 Claims**



1. A landing aid, for a helicopter with a tail rotor, for assisting a pilot to carry out a simulated or real auto-rotation landing, said landing aid comprising means for giving a height-measurement by transmitting and receiving high frequency electromagnetic wave beams, positioned at a tail of a helicopter, said high frequency electromagnetic wave beam having an axis which is directed backwardly and obliquely downward from the tail of the helicopter, means for calculating the tail height responsive to a receipt of the reflected electromagnetic wave signals; computing means for computing the tail sink rate responsive to at least one of said height measurements or re-

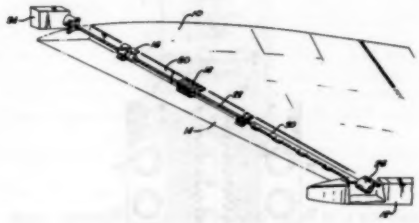
flected electromagnetic wave signal, means for providing a flare signal to tell a pilot when to start a landing flare, and means for providing a warning signal to tell a pilot when to stop the landing flare responsive to the tail sink rate relative to its instantaneous height and a corresponding value indicating a danger of a tail/ground.

4,695,014

AIRCRAFT WING SECTION MOVEMENT APPARATUS

George D. Mourani, Huntington Beach, Calif., assignor to Western Gear Corporation, Lynwood, Calif.

Filed May 25, 1984, Ser. No. 614,252
Int. Cl.[4] B64C *13/24*
U.S. Cl. 244—213 14 Claims



12. In an aircraft wing structure extending outwardly from a fuselage to a wing tip and having a pivotably movable wing section extending therealong, a mechanism for moving said section comprising:

motor means for producing rotary movement;

a torque shaft extending outwardly through said wing toward said tip and connected to said motor means to be rotated thereby;

rotary actuator means disposed adjacent to said tip and operatively connected to said torque shaft for driving said movable wing section at a reduced speed in response to rotation of said torque shaft; and

a return shaft concentric with said torque shaft and disposed around said torque shaft and operatively connected to said rotary actuator means to be driven at said reduced speed, said return shaft extending through said wing toward said motor means and connected to said movable wing section, thereby transmitting forces from said rotary actuator means to said movable wing section.

4,695,015

IMPROVEMENTS RELATING TO BELTS OF INTER-WOVEN SPIRAL WIRES

Ari Salminen, Suorama, Finland, assignor to Tamfelt Oy Ab, Tampere, Finland

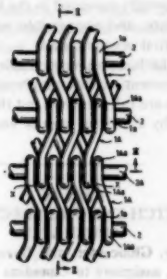
Filed Mar. 6, 1986, Ser. No. 837,360
Claims priority, application Finland, Mar. 22, 1985, 851165
Int. Cl.[4] B21F *27/08*
U.S. Cl. 245—6 9 Claims

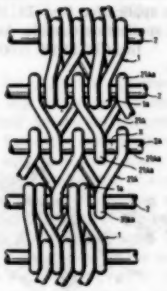
1. A spiral wire belt, comprising:

a plurality of pairs of adjacent thread-like spirals (1) formed with loops (1c) and positioned in pairs with said loops (1a) thereof interlapping and in contact with each other to form transverse rows of loops in the wire belt extending the width of the belt and

linking threads (2) inserted in said rows of loops, respectively, the loops of adjacent spirals in contact with each other being pressed against said linking threads alternately from opposite sides, said belt having opposite ends formed by the plurality of said spirals (1) and linking threads (2); and

means defining a seam portion including at least one pair of seam spirals (1A; 11A; 21A) for connecting the ends of the wire belt to form an endless wire belt, said seam spirals being formed with loops (1Aa, 11Aa, 21Aa) interlapping with each other and arranged such that a clearance (X) is provided between substantially each of the interlapping loops (1Aa; 11Aa; 21Aa) of the seam spirals (1A; 11A; 21A) forming the seam portion, and a seam thread (2A) inserted through said loops of the seam spirals to establish said endless wire belt, said clearance extending in the





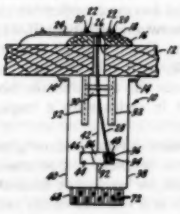
direction of the seam thread (2A) which interconnects said loops of the seam spirals, said clearance (X) being provided between the interlapping loops of the seam spirals only in the seam portion with the interlapping loops of adjacent thread-like spirals (1) being in contact with each other outside the seam portion and without any appreciable clearance therebetween.

4,695,016

SLOW MOTION ACTUATING DEVICE

Stephen A. Worack, 361 Herrick Rd., Riverside, Ill. 60546

Filed Aug. 29, 1985, Ser. No. 770,724
Int. Cl.[4] B61L *1/02*; E01B *7/00*
U.S. Cl. 246—415 A 11 Claims



1. A switch machine for effecting a prototypical throw of model railroad switch points, comprising:

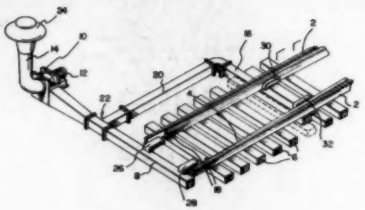
a housing having a first opening therein;
an electric motor mounted in the housing, the motor having a stall current low enough to allow the motor to be continuously stalled without damage to the motor;
circuit means providing electrical connections to the motor;
a set of reduction gears mounted in the housing and driven by the motor;
a swing arm pivotally mounted in the housing, driven by the reduction gears, and engageable with the switch points through the first opening; and
stop means in the housing, engageable with the swing arm, limiting movement of the swing arm to a point where the switch points are fully thrown but the torque of the motor is absorbed by the stop means and not by the switch points.

4,695,017

RAILROAD SWITCH SNOW DEFLECTING AIR NOZZLE APPARATUS

Thomas R. Ringer, Gloucester, and Byrne E. Bramwell, Kars, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation of Ser. No. 826,681, Feb. 6, 1986, abandoned, which is a continuation of Ser. No. 639,415, Aug. 10, 1984, abandoned. This application Dec. 23, 1986, Ser. No. 4,210
Claims priority, application Canada, Aug. 19, 1983, 435008
Int. Cl.[4] E01B 7/00
U.S. Cl. 246—428 **9 Claims**



1. A railroad switch snow deflecting air nozzle apparatus, comprising:

(a) a first elongate conduit for transporting air under and transversely of stationary rails of the switch to a location ahead of switch points thereof,

(b) at least one primary nozzle extending from the first conduit and having an open nozzle end for directing air along the rails and towards the switch points to a position adjacent the apex of the switch and in a direction from the apex towards the heel of the switch,

(c) a second elongate conduit for transporting air under and transversely of the stationary rails to a location spaced from the said at least one primary nozzle and behind the switch points,

(d) at least one secondary nozzle extending from the secondary conduit and having an open nozzle end for directing air along and between movable rails of the railway switch, and in the same direction as air from the said at least one primary nozzle, each said secondary nozzle being about halfway between the apex and the heel of the switch to effectively act in series with a respective said primary nozzle,

(e) air supply means, having a snow protected air inlet, for supplying air at ambient temperatures to the first and second conduits for air to exit from the said at least one primary nozzle at a velocity of the order of 100 mph and from the said at least one secondary nozzle at a velocity of the order of 100 mph to prevent the entry of any falling snow or rain into the switch, and

(f) automatic control means associated with remotely controlled sensors to activate the apparatus at the onset of snow or freezing rain, whereby

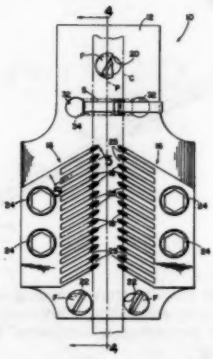
(g) in operation, the railroad switch is maintained operationally free of snow.

4,695,018

CABLE HANGER

Joseph Carswell, Morganton, and Louis Ance, Newton, both of N.C., assignors to BRIntec Corp., Willimantic, Conn.

Filed Jan. 14, 1986, Ser. No. 818,872
Int. Cl.[4] F16L 3/08
U.S. Cl. 248—74.2 **5 Claims**



3. A cable hanger for gripping and securing in fixed position an axially elongated portion of a cable, said cable hanger comprising a mounting base having a rearwardly facing mounting surface, a pair of opposing combs supported on and projecting forwardly from said mounting base at opposite sides of an axial plane intersecting said mounting base and normal to said mounting surface, each of said combs having a finger supporting portion fixed relative to said mounting base and a multiplicity of integral flexible resilient spaced apart fingers projecting in parallel relation to each other from said finger supporting portion, said fingers of each of said combs extending forwardly from said mounting base in generally normal relation to said mounting surface annd defining forwardly extending slots therebetween, said fingers of each of said combs being inclined to said axial plane and in the direction of one end of said mounting base, said fingers being free to move relative to said supporting portion and said mounting base and relative to each other, said fingers of said opposing combs having free ends disposed in opposing spaced apart relation to each other at opposite sides of said axial plane, said free ends cooperating to define a forwardly open generally V-shaped groove converging toward said mounting base and toward an apex disposed within said axial plane, said V-shaped groove having a substantially uniform cross-section throughout its length, said free end portions defining opposing parallel rows of notches of substantially uniform size at opposite sides of said axial plane.

4,695,019

NON-METALLIC STRUT SYSTEM

Verne L. Lindberg, Everett, and Paul A. Stockinger, Tacoma, both of Wash., assignors to Aickin Development Corporation, Everett, Wash.

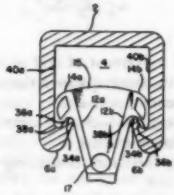
Continuation-in-part of Ser. No. 743,102, Jun. 10, 1985. This application Sep. 26, 1986, Ser. No. 912,963
Int. Cl.[4] F16L 3/03
U.S. Cl. 248—74.3 **1 Claim**

1. In combination:

a. a fiberglass structural support element having sides forming a longitudinal slot;

b. longitudinal flanges inwardly projecting toward the center line of said support element along the sides of said support element, each of said longitudinal flanges having an interior surface ajacent said slot, said interior surface of said longitudinal flanges having a rounded portion where said longitudinal flanges meet the sides of said support element, said longitudinal flanges having rounded edges of a predetermined radius;

c. a pair of complemental composite thermoplastic pipe supporting bands having bottom portions forming a natural curvature for cradling a pipe when the end of said bands are engaged, said supporting bands having a top portion integral with said bottom portion, said top portion having distal flanges, said distal flanges having side portions, undersides, rounded bottom edges of a pre-determined radius, and otherwise so shaped as to allow substantially full and interlocking contact between the side portion of said distal flanges and the sides of said support element and between the undersides of said distal flanges, including their rounded edges and the interior surface of said longitudinal flanges including the rounded portions of said longitudinal flanges where said longitudinal flanges meet the sides of said support element, and the rounded edges of said longitudinal flanges when the top portion of said support bands is disposed within said longitudinal slot; and



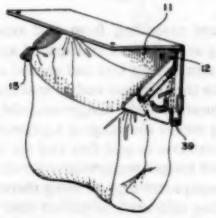
d. adjustable holding means on the bottom portion of said supporting bands for connecting and locking said support bands around a pipe.

4,695,020

APPARATUS FOR HOLDING DISPOSABLE BAGS

John Collins, Bldg. A-2-Apt. #412, 7715 SW. 86th St., Miami, Fla. 33143

Filed Jun. 26, 1986, Ser. No. 878,624
Int. Cl.[4] B65B *67/04*
U.S. Cl. 248—100 **10 Claims**



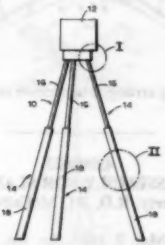
1. Bag-holding apparatus for attaching either a plastic or paper bag thereto and thereby allowing reuse of the bags, said apparatus comprising a back portion with rotatable top and side members attached thereto, brace members formed from said back member, each being hinge connected to said back portion along one edge of said brace member, said brace members each being received in slot means formed in said side members to keep said side members in a perpendicular position with respect to the back portion, said top member resting upon upper edges of said side members when said top member is rotated downward relative to said back member, and bag holding means for attaching said plastic or paper bag to said bag-holding apparatus.

4,695,021

SUPPORT STAND WITH ADJUSTABLE LEGS

Klaus Leinfelder, Oberasbach, Fed. Rep. of Germany, assignor to Cullmann Handelsgesellschaft fiir Verbrauchsgiitter mbH, Langenzenn-Laubendorf, France

Filed Sep. 30, 1985, Ser. No. 782,426
Int. Cl.[4] B64G *1/36*
U.S. Cl. 248—168 **7 Claims**



1. A suppport stand for an item of equipment, comprising: a hand portion; support legs which are connected to the head portion and which extend downwardly therefrom and each of which comprise inner and outer tube portions displaceable in telescope relationship with each other; and a respective fixing means adapted to fix the tube portions of each leg relative to each other, said fixing means comprising an actuating rod displaceable in the axial direction of the respective leg and actuable from outside the tube portions, first and second clamping cone members which taper in the same direction and which are disposed on the actuating rod in the vicinity of the lower end of the inner said tube portion, a respective expandable pressure element around each said cone member and co-operative therewith, holding members holding said pressure elements axially immovably on said lower end of the inner tube portion whereby said pressure elements are adapted top bear against the inside wall surface of the outer one of said tube portions under the action of the associated cone members, and a resilient means operable to urge said actuating rod in the direction in which said cone members taper whereby in a normal operating condition of the fixing means towards which said cone members are urged said cone members press said pressure elements against the inside wall surface of the outer tube portion, with such a force as to provide a frictional connection which can be overcome by hand between the two tube portions.

4,695,022

CLARINET STAND

Alvin A. Mendonsa, 2860 Ransford Ave., Monterey, Calif. 93940, and Donald D. Eshoff, 87 San Benancio Rd., Salinas, Calif. 93908

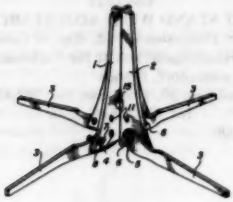
Filed May 21, 1984, Ser. No. 612,350
Int. Cl.[4] F16M *11/00*
U.S. Cl. 248—176 **12 Claims**

1. A stand for supporting musical instruments which have a bell, said stand having an open configuration for supporting said instruments and a closed configuration for storing and transporting within said instruments, said stand comprising:

a support portion having an outside contour which substantially conforms to the inside contour of the bell of said instruments, and having a plurality of cavities formed within the outside contour thereof; and

a plurality of legs, movably coupled to the support portion,

having a lockably open position to form the open configuration of the stand, and a lockably closed position to form the closed configuration of the stand, said legs being formed to fit within said cavities of the support portion;



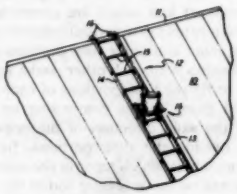
said cavities being arranged to receive said legs in said closed configuration.

4,695,023

PLATFORM ASSEMBLY FOR SLANTED LADDER

Stanley E. McCafferty, R.D. #1, McCafferty Rd., Greenville, N.Y. 12083

Filed Mar. 2, 1987, Ser. No. 20,697
Int. Cl.[4] E06C 7/14
U.S. Cl. 248—238 **5 Claims**



1. In a platform assembly for a slanted ladder wherein a base is to be hooked to and lie against rungs of the ladder, a platform is hinged to the base, and a brace is pivoted to the platform to abut the base and hold the platform and base at an included angle which substantially levels the platform, adjustment means for varying said included angle to accomodate different ladder angles comprising

(a) a pair of parallel side flanges on the platform formed with respective arrays of holes in registry with one another and with each array describing an arc about a common axis which is also the pivot axis of the brace on the platform, and

(b) a pair of coaxial pins on the brace movable simultaneously in opposite directions away from one another into a corresponding pair of coaxial holes in the respective side flanges to fix the platform and brace at a predetermined included angle and toward one another out of said pair of holes to permit the brace to be pivoted on the platform side flanges so that the pins can register with a different selected pair of registered holes.

4,695,024

TEST SYSTEM MANIPULATOR ARM

Kenneth R. Haven, Fremont, Calif., assignor to Attain, Inc., Milpitas, Calif.

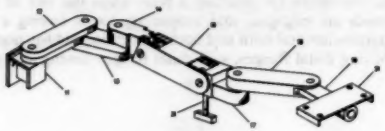
Filed May 9, 1986, Ser. No. 861,189
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—281.1 **4 Claims**

1. An adjustable arm for controlling the horizontal and vertical position of an object mounted at one end of said arm, said arm comprising:

means for rigidly mounting the end of said arm opposite said end at which said object is mounted;

a plurality of interconnected links, a first group of said plurality of links controlling the horizontal position of said arm and said object;

a counterbalancing link among said plurality of links, said counterbalancing link being disposed intermediate said first group of links, said counterbalancing link serving to



provide vertical movement of said plurality of links and said object and to counterbalance the weight of said object at said one end of said arm;

said counterbalancing link including a gas spring for supplying a counterbalancing force;

means for adjusting the counterbalancing force supplied by said gas spring; and

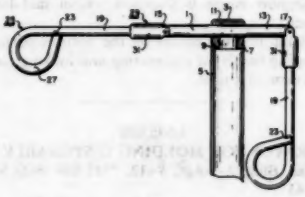
said adjusting means including a ramped surface for controlling the force supplied by said gas spring.

4,695,025

HANGER ASSEMBLY

Thomas L. Vaughan, 27272 Cool Water Ranch Rd., Valley Center, Calif. 92082

Filed Nov. 1, 1985, Ser. No. 793,963
Int. Cl.[4] E04G 3/00
U.S. Cl. 248—293 **26 Claims**



1. A hanger assembly for an upright equipment pole, said assembly comprising:

(a) means for attaching the hanger assembly to the equipment pole;

(b) a cross-arm extending from said attaching means and terminating at a terminal end spaced apart from the pole;

(c) a hanger arm having first and second ends, said first end mating with the terminal end of said cross-arm in at least one configuration of the hanger assembly, said hanger arm comprising means for hanging equipment therefrom; and

(d) means proximate to said first end for locking said cross-arm and said hanger arm into an operational configuration such that equipment may be hung therefrom, and thereafter unlocking said arms to permit said hanger arm to be swung into a storage configuration.

4,695,026

HOLDER FOR EYE GLASSES

Travis D. Medley, Jr., 1551 Brenner Way, San Jose, Calif. 95118

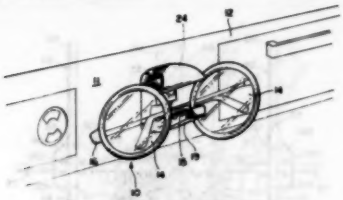
Filed Mar. 3, 1986, Ser. No. 835,156
Int. Cl.[4] A47F 5/00
U.S. Cl. 248—316.5 **4 Claims**

1. An eye glass holder for holding eye glasses having a pair

of lenses connected by a nose piece and having attached a pair of ear pieces, said holder comprising:

a base member having first and second ends,

a support member fixed to the first end of said base member and formed to extend from said base member and receive the nose piece of the eye glasses and forming at the juncture with said base member an enlarged opening to receive the sun glass earpieces,



a clamping member pivotally attached to the second end of said base member to extend in the same direction as said support member and positioned to contact and clamp the eye glasses against said support member, and

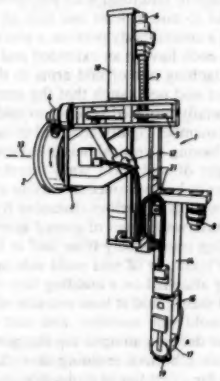
means biasing said clamping member towards said base member whereby the eye glasses can be placed with the nose piece on said support member and the earpieces in said enlarged opening and the clamping member moved into contact therewith to hold said eye glasses.

4,695,027

INDUSTRIAL ROBOT INSTALLATION

Carl-Henrik Lindholm, Viken, and Christer Lundström, Enköping, both of Sweden, assignors to Asea Aktiebolag, Västerås, Sweden

Filed Jun. 2, 1986, Ser. No. 869,366
Int. Cl.[4] A47H *1/10*
U.S. Cl. 248—325 **9 Claims**



1. An industrial robot installation including at least one robot of pendulum type, said robot comprising

a robot stand rotatable about a first axis,

an arm system including a primary arm and a secondary arm, said primary arm being pivotably journalled in said stand about a second axis oriented transversely across the longitudinal direction of the primary arm, and said secondary arm being movably journalled on said primary arm,

a counterweight displaceably mounted on said primary arm for counterbalancing said arm system, and

a movement-transmitting mechanism interconnecting said secondary arm and said counterweight,

said secondary arm and said counterweight being simultaneously linearly displaceable towards and away from each other, respectively, on respective sides of said second axis such that, independently of the position of said secondary arm on said primary arm, the centre of gravity of said arm system is located on or in immediate proximity to said second axis.

4,695,028

DEVICE FOR HOLDING CONSTRUCTION MATERIALS

Wayne W. Hunter, 2823 Sherman Ave., NW., Apt. #2, Washington, D.C. 20036

Filed Apr. 14, 1986, Ser. No. 851,634
Int. Cl.[4] E04G *25/00*
U.S. Cl. 248—354.1 **7 Claims**

1. A device for holding a sheet of construction material in an elevated position so that the sheet may be secured to a ceiling comprising:

a first rigid member,

a second member which is elongated and which is spaced from said first member and adapted to assume an upper and lower position with respect to said first member, said second member having a support means at one end for holding said sheet,

spring means attached at opposite ends to said first and second members respectively for upwardly urging said second member to said upper position;

retaining means for releasably retaining said second member in said lower position, and activable release means for upon activation releasing said retaining means and causing said spring means to quickly propel said second member from said lower to said upper position.

4,695,029

SUPPORT DEVICE FOR SECURING A RAZOR TO A SHAVING CREAM DISPENSER

Jeffrey A. Fox, 4374 Ventura Canyon Ave., #5, Sherman Oaks, Calif. 91403, and Cheryl Fox, 3274 Ventura Canyon Ave., #5, Sherman Oaks, Calif. 91403

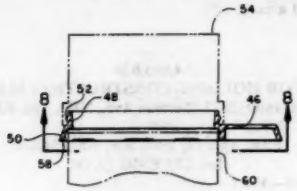
Continuation-in-part of Ser. No. 690,927, Jan. 11, 1985, abandoned. This application Jan. 8, 1986, Ser. No. 816,934
Int. Cl.[4] A47G *29/00*
U.S. Cl. 248—360 **5 Claims**

1. An adapter for attachment to a cosmetic dispensing unit having a peripheral bead for receiving a cap, said adapter comprising:

a collar member having a radially outwardly extending flange defining an opening therethrough,

first and second rims extending in opposite longitudinal directions from said collar member;

first means carried by said first rim for removably affixing



said collar member to said peripheral bead on said dispensing unit; and

second means carried by said second rim for removably securing the cap.

4,695,030

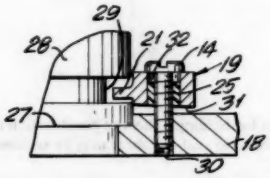
QUICK RELEASE CLAMP

Jay P. Fischer, 210 Hopkins Rd., Watertown, Conn. 06795

Filed Sep. 3, 1985, Ser. No. 772,048

Int. Cl.[4] B25B *5/08*

U.S. Cl. 248—507 **3 Claims**



1. A clamp for securing a component having an annular flange thereon to a support, comprising:

a clamp body having a central bore therein;

said clamp body including a top and a bottom;

a clamping lip extending about a portion, and less than all of a perimeter of said clamp body;

a first cam-shaped portion on said bottom;

said first cam-shaped portion extending a substantial distance below said clamping lip;

said first cam-shaped portion and said clamping lip being joined along a generally linear stop;

a clamping screw;

a first diameter of said central bore being substantially greater than a second diameter of said clamping screw;

a plastic insert in said central bore occupying substantially all of a radial distance between said first diameter and said second diameter;

said plastic insert having a length substantially less than a length of said central bore;

a second cam-shaped portion on said top;

said second cam-shaped portion extending a substantial distance above said clamping lip, whereby a length of said central bore is increased; and

said second cam-shaped portion having a shape substantially identical to said first cam-shaped portion and aligned therewith, whereby a rotational position of said first cam-shaped portion is ascertainable by observing the same rotational position of said second cam-shaped portion.

4,695,031

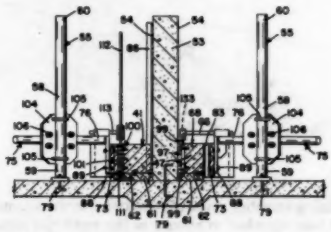
GANG FORM

Edward A. Proctor, 3417 Clarendon Rd., Cleveland Heights, Ohio 44118

Continuation-in-part of Ser. No. 575,288, Jan. 30, 1984, abandoned. This application Nov. 14, 1985, Ser. No. 797,843

Int. Cl.[4] B28B *7/22*

U.S. Cl. 249—91 **12 Claims**



1. A gang form for molding a plurality of elongated concrete beams, each beam, when in use, having a pair of spaced apart, elongated, generally vertical side surfaces interconnecting a top surface and a bottom surface, said top surface having corrugations extending over the length of the beam, said beam further including embedded reinforcement adjacent to said bottom surface, said beams being molded on their sides, one beam on top of another in superimposed tiers such that the vertical side surfaces are cast in a generally horizontal position, the gang form comprising a concrete base slab having a planar upper surface; a straight vertical concrete form wall rigidly secured centrally on said planar upper surface; a starter slab adjacent to the base slab and extending transversely from at least one side of said form wall; a plurality of upright posts attached to the upper surface of the base slab and spaced from said at least one side of said form wall, said posts being aligned in a plane parallel to said at least one side of said form wall, each post having a central body portion; a plurality of horizontal support arms each having an extended end portion; means for adjustably attaching one of said arms to the central body portion of each of said posts such that the arms may be vertically and horizontally adjusted relative to said posts; an individual mold side member rigidly attached to said end portions of said arms and having a vertical height substantially less than the vertical height of said form wall, thereby enabling said mold side member to be positioned at various elevations above the base slab as well as at various distances from said at least one side of said form wall; a pair of spaced apart end wall mold members extending transversely from said at least one side of said first wall; at least one of said mold side member and said form wall having attached on a molding face thereof a plurality of corrugated sheets; said at least one side of said form wall, said individual mold side member, and said end wall mold members together defining an open top elongated trough mold compartment with a bottom molding face defined either by said starting slab for a first tier of molded beams, or by a previous tier for second and subsequent tiers of molded beams.

4,695,032

CONVERTIBLE MOULD

Lucien A. Desport, Paris, France, assignor to Engineering Management Data Processing (E.M.D.P.), Paris, France

Filed Aug. 14, 1985, Ser. No. 765,916

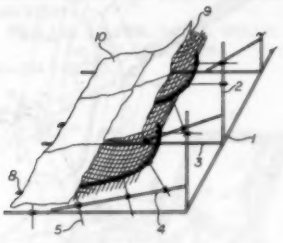
Claims priority, application France, Aug. 31, 1984, 84 13506

Int. Cl.[4] B29C *41/38*

U.S. Cl. 249—112 **10 Claims**

1. A convertible mould for moulding an object having a surface with first principal lines which extend in first parallel planes and second principal lines which extend in second parallel planes intersecting the first planes, comprising a frame, a

plurality of rows each having a plurality of head-holders mounted on the frame, each row extending in one of said first planes, a head supported by each head-holder, primary slats having longitudinal dimensions substantially greater than their lateral dimensions, secondary slats interlaced with the primary slats and fixed thereon, each head including means for supporting said primary slats with the longitudinal dimensions thereof



extending along said first principal lines, the support means being pivotable about an axis parallel to the first principal line to allow support of a principal slat in a twisted condition that accommodates the configuration of an adjacent secondary slat thereby allowing the primary and secondary slats to locally conform to said surface, and sheets applied to the secondary slats.

4,695,033

MODULAR PANEL FOR MOLD

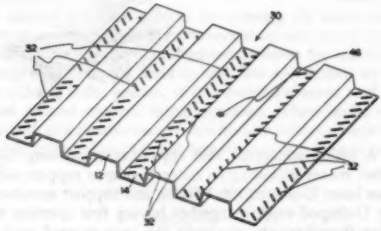
Fumihiro Imaeda, and Yoshio Imaeda, both of Nagoya, Japan, assignors to Shin Nihon Kohan Co., Ltd., Komaki, Japan

Filed Dec. 27, 1985, Ser. No. 814,197

Claims priority, application Japan, Oct. 19, 1985, 60-160651[U]; Oct. 19, 1985, 60-160650[U]

Int. Cl.⁴ E04G *9/10, 11/46*

U.S. Cl. 249—189 **11 Claims**



1. A modular panel for forming a mold, comprising:

a plurality of parallel longitudinal ridges and a plurality of parallel longitudinal troughs which extend in a predetermined direction and alternate with each other, said ridges and troughs being connected by walls forming an angle other than an acute angle with said troughs; and

a plurality of elongate openings formed through at least opposite end portions of a bottom of at least each of said troughs, not in parallel with the direction of the trough, but at an angle other than a right angle thereto, and in such a manner that said elongate openings, when aligned with openings of another modular panel define through passages for nails and enable said modular panels to mount substantially flush with one another,

wherein said elongate openings are disposed in said trough in at least one array wherein those openings of said at least one array located above a transversal centerline of the panel are disposed at angles opposite to those openings located below said centerline.

4,695,034

FLUID CONTROL DEVICE

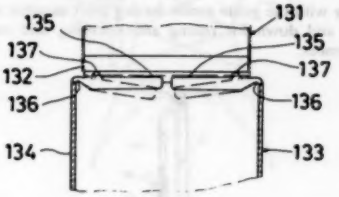
Tetsuo Shimizu; Kiyoharu Tujimura, and Michinori Iwamoto, all of Kyoto, Japan, assignors to STEC Inc., Kyoto, Japan

Filed Nov. 19, 1985, Ser. No. 799,739

Claims priority, application Japan, Nov. 27, 1984, 59-249860; Jul. 9, 1985, 60-152035

Int. Cl.⁴ F16K *31/02*

U.S. Cl. 251—129.06 **19 Claims**



1. A fluid control device, comprising:

a housing having an inlet, an outlet, and a fluid passage connecting said inlet and said outlet; and

valve means disposed in said housing for preventing fluid from passing from said inlet to said outlet, said valve means comprising a valve seat forming part of said fluid passage, a movable valve body having one end which engages said valve seat to prevent fluid from passing from said inlet to said outlet, a piezoelectric stack means disposed on said housing for moving said valve body towards said valve seat in response to electrical energy supplied to said piezoelectric stack means, elastic partition means forming another part of said fluid passage connected between said piezoelectric stack means and the other end of said valve body for providing a fluid tight seal between said passage and said piezoelectric stack means, and driving force transmission member means connected to said piezoelectric stack means for amplifying the amount of movement of said valve body towards said valve seat relative to the amount of movement produced by only said piezoelectric stack means when electrical energy is supplied to said piezoelectric stack means.

4,695,035

JACK FOR INSTALLING A MINE STOPPING

John M. Kennedy, and William R. Kennedy, both of P.O. Box 38, Taylorville, Ill. 62568

Filed Oct. 25, 1985, Ser. No. 791,577

Int. Cl.⁴ B66F *3/24*

U.S. Cl. 254—93 R **17 Claims**

1. A jack for installing in a mine a plurality of elongate extensible panels adapted to extend vertically in side-by-side relation from the floor to the roof of a passageway in a mine, each panel comprising a first elongate member constituting a lower member of the panel adapted for engagement of its lower end with the floor of the passageway, and a second elongate member constituting an upper member of the panel adapted for engagement of its upper end with the roof of the passageway, each of said panel members being a sheet metal member of channel shape in cross section having a web and flanges at opposite sides of the web, each flange having an inturned portion at its outer edge extending generally parallel to the web, one of said members having a telescoping sliding fit in the other with the webs of the members in engagement, the one member constituting the inner member and the other constituting the outer member of the panel, a plurality of the panels being adapted to be installed in a passageway with the

side flanges of the outer members generally in engagement, the upper member of each panel having a head at its upper end, the lower member of each panel having a foot at its lower end, said jack comprising:

a base adapted to fit between the flanges of a lower panel member and engage the foot of said lower panel member;

an extensible member having means at its upper end adapted to fit between the flanges of an upper panel member and engage the head of said upper panel member;

guide means extending up from the base guiding said extensible member for up and down movement relative to said guide means and the base;

a hydraulic jack cylinder extending up from the base coaxially with the guide means having a lift member movable up and down for raising and lowering said extensible member;

a hydraulic pump on the base for pumping hydraulic fluid to said cylinder for moving the lift member and said extensible member upwardly; and

means for operating the pump comprising a handle pivoted on the guide means at a level convenient for an operator and a link from the handle to the pump, said means at the upper end of said extensible member comprising a crosshead contractible in length for insertion of the crosshead between the flanges of said upper panel member to a position below the head of said upper panel member, and extensible to a length greater than the distance between said flanges whereby the crosshead is adapted for engagement with the flanges to maintain the crosshead in said position below the head of the upper panel member.

4,695,036

SCREW BAR FOR A PANTOGRAPH-TYPE JACK

Kazuyoshi Yukimoto, Kariya; Kenichi Fukura, and Nobuhiro Yamauchi, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Dec. 27, 1985, Ser. No. 813,975

Claims priority, application Japan, Dec. 27, 1984, 59-279054

Int. Cl.[4] B66F *3/22*

U.S. Cl. 254—126 **3 Claims**

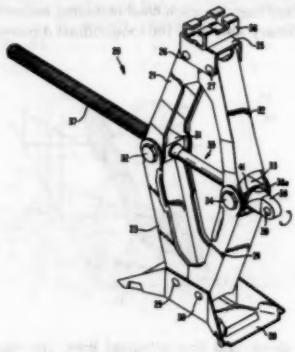
1. A screw bar for connecting a nut member and a bearing member of a pantograph-type jack, comprising:

a cylindrical-shaped bar member having a predetermined diameter, a first end, and a second end;

a joint portion integral with said bar member at said first end and including a flange portion having a preselected outer diameter;

a threaded portion formed on said bar member at said second end, said threaded portion having a maximum outside diameter greater than said predetermined diameter of said bar member, said nut member being threadably engageable with said threaded portion; and

a bearing support portion adjacent said joint portion, said bearing support portion having a desired diameter less



than said preselected outer diameter of said flange portion and greater than or equal to said maximum outside diameter of said threaded portion, said bearing member being pivotally mountable on said bearing support portion.

4,695,037

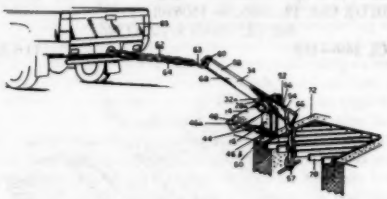
LIFTING APPARATUS

David L. Hadbavny, Box 283, Westmoreland City, Pa. 15692

Filed Mar. 6, 1987, Ser. No. 23,115

Int. Cl.[4] B66F *11/00*

U.S. Cl. 254—131 **6 Claims**



1. A lifting apparatus, said apparatus comprising fulcrum member means including an outer U-shaped support member and an inner U-shaped rim holding and support member, said outer U-shaped support member having first aperture means passing therethrough proximate the ends thereof, said inner U-shaped rim holding and support member having second aperture means passing therethrough proximate ends thereof, a lever having third aperture means passing therethrough at a predetermined pivot point, said fulcrum member means further comprising a bolt member, said bolt member passing through said first aperture means of said outer U-shaped support member, said second aperture means of said inner U-shaped rim holding and support member and said third aperture means of said lever, a nut affixed to said bolt member, a collapsible connector member affixed at one end to the bottom of said outer U-shaped support member and said collapsible connector member affixed at the other end thereof to the bottom portion of said inner U-shaped rim holding and support member, said lever at one end thereof proximate said third aperture means having a groove therein in the upper edge thereof, means for pulling said lever affixed to said lever proximate the other end thereof, grate engaging means engagable with said lever proximate said groove, whereby upon affixing said grate engaging means to a grate and applying force by said means for pulling

said lever said grate will lift with little physical effort, upon completion of use of said lifting apparatus it may be folded for easy storage.

4,695,038

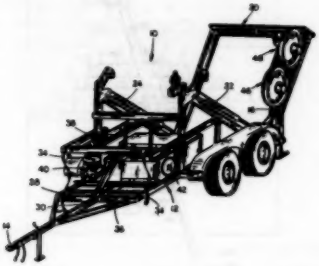
MEANS FOR PULLING FIBER OPTIC CABLE THROUGH A CONDUIT

D. William Giroux, 3 Lakewood Villa, Lake Manawa, Council Bluffs, Iowa 51501

Filed Aug. 22, 1986, Ser. No. 899,321

Int. Cl.[4] E21C *29/16*

U.S. Cl. 254—134.3 FT **6 Claims**



1. A pulling machine, comprising, a frame means, first and second puller pinch wheels rotatably mounted on

said frame means adapted to have a flexible line means extending around, a first hydraulic motor operatively connected to said first

puller pinch wheel for rotating said first puller pinch wheel in a first direction, a second hydraulic motor operatively connected to said

second puller pinch wheel for rotating said second puller pinch wheel in a second direction which is opposite to said first direction, a hydraulic pump means operatively connected to said first

and second hydraulic motors for rotating the same, and a valve means operatively connected to said pump means and said first and second hydraulic motors for selectively supplying hydraulic fluid to said first and second motors in either a series manner or in a parallel manner, said first and second motors being operated, when series connected, at a greater speed but with less pulling power than when said first and second motors are connected in parallel.

4,695,039

BRACKET AND REPAIR METHOD

Kenneth Clossen, 7601 Belmount Ave., Cheyenne, Wyo. 82009

Filed Dec. 2, 1985, Ser. No. 803,139

Int. Cl.[4] H02G *1/00*

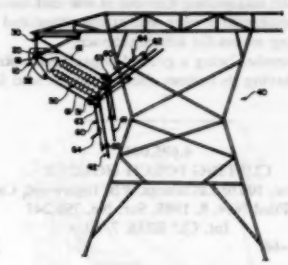
U.S. Cl. 254—134.3 R **6 Claims**

1. A method for temporarily supporting high tension electrical conductor lines which are suspended by means of a suspension system from a gate member on a tower in a manner such that repairs to, or replacement of, said suspension system may be performed, said method comprising the steps of:

(a) providing a C-shaped bracket comprising a generally planar body portion and two elongated arms carried by said body portion, wherein each said arm includes attachment means, wherein said arms are integral with said body portion; wherein each said arm has a length in the range of about 40 to 48 inches; wherein one said arm forms a 90° angle with said body portion; and wherein said bracket is adapted to withstand at least 60,000 pounds of force applied to said arms;

(b) supporting said bracket on said gate member in a manner such that said arms project toward said electrical conductor lines;

(c) connecting one of said electrical conductor lines to each said arm of said bracket by means of tensioning means having first and second ends, wherein said first end of said tensioning means is connected to one arm of said bracket by means of said attachment means, and wherein said



second end of said tensioning means is connected to one of said electrical conductor lines;

(d) pulling said electrical conductor lines toward said bracket by means of said tensioning means sufficiently to enable said suspension system to be disconnected and removed from said electrical conductor lines while said lines are retained and supported by said bracket; whereby said suspension system may be repaired or replaced.

4,695,040

ERECTING RIG FOR A WELL PUMP

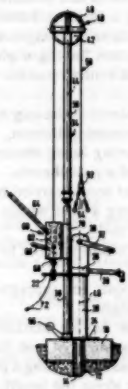
Günther Hantschk, Waldkraiburg, Fed. Rep. of Germany, assignor to Netzsch-Mohnopumpen GmbH, Waldkraiburg, Fed. Rep. of Germany

Continuation of Ser. No. 658,709, Oct. 9, 1984, abandoned. This application Jun. 4, 1986, Ser. No. 873,100

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1983, 3337698

Int. Cl.[4] B66D *3/14*

U.S. Cl. 254—264 **9 Claims**



1. An erecting rig for a well pump having a string of several releasably coupled risers comprising

a hollow upright;

a head member and a foot member fixed to top and bottom ends, respectively, of the upright;

a mast supported by said upright;

guide pulley means arranged at an upper end of said mast and having a radius which corresponds substantially to the distance between the axes of said mast and said upright, the distance determined by said head member and said foot member;

a pulling element passing around said pulley means and said pulling element including connected elements extended downward from said pulley means in parallel lines to each other with said pulling element at one end having means for suspension of a riser and at the other end having a connecting means for a lifting device;

said foot member being a ground engaging member;

said mast having its bottom abutted against said foot member.

4,695,041

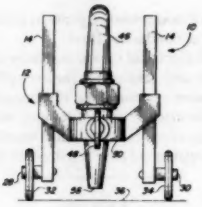
CUTTING TORCH HOLDER

James L. Clites, 10670 LaCienega, #B, Inglewood, Calif. 90304

Filed Nov. 8, 1985, Ser. No. 796,247

Int. Cl.[4] B23K *7/10*

U.S. Cl. 266—66 **12 Claims**



1. An improved cutting torch holder, said holder comprising, in combination:

(a) a frame adapted to releasably receive and retain the nozzle of a cutting torch, said frame including:

(1) a central portion defining a vertically extending passageway adapted to receive said nozzle,

(2) said passageway being configured so as to wedge said nozzle in a predetermined position,

(3) at least one set screw carried by said central portion for securing said nozzle in said predetermined position, said set screw having a portion thereof extending along a horizontal line into said passageway,

(4) said central portion having a plurality of extensions integral with said central portion and radiating therefrom,

(i) each of said extensions having a vertically extending post-receiving opening therein,

(ii) each said opening being dimensioned so as to prevent rotation of a post therein,

(iii) at least one set screw carried by each of said extensions for securing a post within the opening in each said extension, and

(b) height adjustment means secured to said frame, comprising

(1) a plurality of posts for supporting said frame at at predetermined height,

(i) each said post having marker means thereon for effecting an alignment of said frame,

(ii) said marker means including a plurality of horizontal lines extending along the length of each post,

(iii) at least one set screw carried by each of said extensions for securing a post within the opening in each said extension, and

(c) roller means secured to at least one of said posts adjacent the lower end thereof below said frame, whereby said frame can readily be moved along a surface to effect controlled travel of a cutting torch which is carried by said frame and maintained at a predetermined distance above said surface.

4,695,042

LANCE SUPPORTING APPARATUS

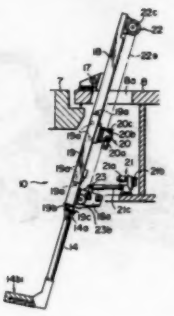
Takenori Kudou, Oita, Japan, assignor to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 17, 1986, Ser. No. 840,276

Claims priority, application Japan, Apr. 2, 1985, 60-68394

Int. Cl.[4] C21C *5/30*

U.S. Cl. 266—226 **1 Claim**



1. A lance supporting apparatus comprising:

a rotatable doughnut-shaped turntable for supporting a plurality of vacuum degassing vessels;

a circular turntable rotatable within a plane and disposed in an area within the inner diameter portion of said doughnut-shaped turntable; and

a plurality of lance operation units mounted on said circular turntable, each of said lance operation units detachably supporting a lance for inserting a gas and/or powdered treating agent into a molten metal, said lance operation units having mechanisms for lifting, lowering, rotating and tilting said supported lance.

4,695,043

GAS SCAVENGING APPARATUS FOR METALLURGICAL VESSELS

Manfred Winkelmann, Krefeld; Hans Rothfuss, Wiesbaden; Udo Muschner, Krefeld, and Karl H. Schmitt, Meerbusch, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Oct. 27, 1986, Ser. No. 923,635

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542781

Int. Cl.[4] C21B *7/16*

U.S. Cl. 266—265 **15 Claims**

1. In a gas scavenging apparatus for use in a metallurgical vessel containing molten metal, said apparatus including a frusto-conical refractory inner scavenging block to be inserted in a refractory lining of the vessel and to have passed therethrough a scavenging gas to be supplied to the molten metal in the vessel, said inner scavenging block having a smaller end surface facing the molten metal and a larger base end directed away from the molten metal, the improvement comprising:

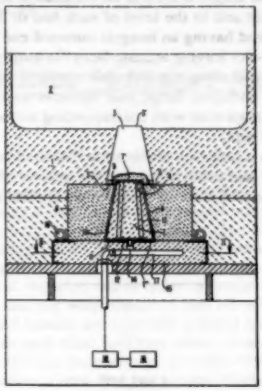
a mounting brick positioned outwardly of said inner scavenging block;

a frusto-conical refractory outer scavenging block extending through said mounting brick, said outer scavenging block having a smaller end surface smaller than and facing said larger base end of said inner scavenging block and a larger base end directed away from said inner scavenging block;

said larger base end of said inner scavenging block having an annular end surface extending outwardly away from said

smaller end surface of said outer scavenging block and resting on said mounting brick; and

said inner scavenging block being formed of a refractory material porous to the scavenging gas, and said outer



scavenging block having extending therethrough capillary passages;

whereby scavenging gas may be passed through said outer scavenging block and then through said inner scavenging block to be supplied to the molten metal.

4,695,044

APPARATUS FOR SECURING A PHOTOSENSITIVE SHEET

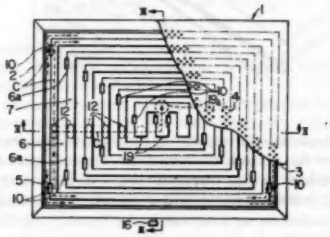
Takamichi Nishihama; Kotaro Okada, and Shigekazu Kadota, all of Shiga, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Apr. 25, 1986, Ser. No. 856,936

Claims priority, application Japan, May 10, 1985, 60-99976

Int. Cl.[4] B25B *11/00*

U.S. Cl. 269—21 **3 Claims**



1. An apparatus for securing a sheet material under suction, the apparatus comprising: a face plate including a number of suction pores adapted to allow air to pass through, a base plate including outlet ports, corrugated plate interlocated between the face plate and the base plate, the corrugated plate including hill portions and valley portions alternately produced, each hill portion and valley portion taking the form of rectangles produced concentrically of the base plate, the corrugated plate further including inlet grooves between one hill portion and another, and outlet grooves between one valley portion and another, each outlet groove including one outlet port in the base plate, the inlet grooves and a outlet grooves being communicated with each other through a communication port produced in the partition wherein the port is located at a point distant from the outlet ports; and means for communicating the outlet grooves with a power suction means.

4,695,045

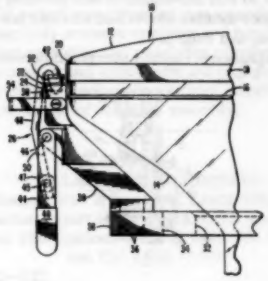
APPARATUS FOR SECURING A CATHODE-RAY TUBE DURING PROCESSING

Thomas L. Chase, and Kenneth A. Long, both of Lancaster, Pa., assignors to RCA Corporation, Princeton, N.J.

Filed Jul. 28, 1986, Ser. No. 889,625

Int. Cl.[4] B25B *1/14*

U.S. Cl. 269—152 **6 Claims**



1. An apparatus for securing a cathode-ray tube during processing utilizing mounting lugs attached to said tube, each of said lugs having an end projecting away from said tube and containing an aperture, comprising:

a platform having a plurality of legs positioned to support, respectively, the ends of said moutning lugs, each of said legs having a receess therein aligned with the aperture in said respective end, and

means pivotally attached to each of said legs for clamping said respective lug to said leg by projecting an end portion of said clamping means through said aperture into the respective recess when pivoted, each of said clamping means comprising a handle rotatably attached to the respective leg for pivoting about a fixed axis, and also a J-shaped clamp having a substantially straight portion rotatably attached to said handle about a movable axis and a curved end portion rigidly fixed to said straight portion and positioned to project through said respective aperture, each of said straight portions being attached to said respective handle in a manner that allows each straight portion to move laterally along and rotate feely about said movable axis, whereby said curved portions securely hold said lugs to said respective legs when said handles are pivoted away from said lugs.

4,695,046

SPECIMEN HOLDER CLAMP FOR A MICROTOME

Manfred Berleth, Eppelheim, Fed. Rep. of Germany, assignor to Cambridge Instruments GmbH, Heidelberger, Fed. Rep. of Germany

Filed Jul. 27, 1984, Ser. No. 634,928

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1983, 3327619

Int. Cl.[4] B25B *1/02*

U.S. Cl. 269—210 **7 Claims**

1. A specimen holder clamp for rotary microtome, comprising

a guide member,

a fixed jaw mounted on said guide member,

a first engagement element coacting with said guide member to permit sliding movement of said first engagement element relative to and along the length of said guide member wherein the relative movement of said first engage-

ment element is guided by said guide member along a first path, said first engagement element defining a fine-pitch threaded bore extending along a second path oriented generally parallel to said first path,

a rotatable spindle operatively joined to said guide member and coacting with said fine-pitch threaded bore in said first engagement element so that rotation of said spindle relative to said guide member moves said first engagement element relative to said guide member along said first path,

a movable jaw slidably carried by said first engagement element and positioned in general alignment with said fixed jaw so that movement of said movable jaw relative to said guide member moves said movable jaw toward and away from said fixed jaw,

a second engagement element interposed between said movable jaw and said first engagement element and defining with said first engagement element complementary engagement surfaces which when in operative engagement with one another fixedly secures said movable jaw to said first engagement element for movement therewith, and

disengagement means carried by said movable jaw and cooperating with said second engagement element for disengaging said complementary engagement surfaces from one another to permit said movable jaw to be manually moved relative to said first engagement element toward and away from said fixed jaw and thereby permit coarse manual adjustment of said movable jaw and rotation of said rotatable spindle relative to said guide member moves said first engagement element, cooperatively, with said second engagement element to provide fine adjustment of said movable jaw when said first and second engagement elements are engaged.

4,695,047

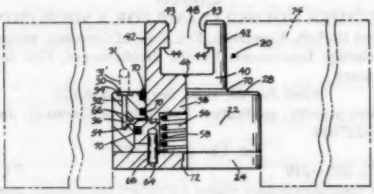
T-SLOT HYDRAULIC CLAMP SYSTEM

Winfried Ehrhardt; Klaus Richter, and Adolf Lehr, all of Laubach, Fed. Rep. of Germany, assignors to Carr Lane Roemheld Manufacturing Co., Inc., St. Louis, Mo.

Filed Oct. 14, 1986, Ser. No. 918,573

Int. Cl.[4] B23Q *3/02*

U.S. Cl. 269—309 **5 Claims**



1. For installation within a bore and counterbore in and through the T-slot of a conventional machine tool bed or bolster plate,

a fluid-pressure actuated clamp including

a cylinder whose diameter is adapted to fit within such counterbore, the cylinder having an annular outer end surface adapted to fit at the juncture of such bore and counterbore,

there being means adjacent to said end surface to provide for inflow of fluid under pressure, and

a piston rod whose diameter fits slidingly within such bore, and whose length is such as on installation to project into such T-slot and to the level of such bed or bolster plate,

said piston rod having an integral outward end divided by a central T-slot leaving arcuate faces outwardly of said slot, said slot including parallel slide surfaces terminating in opposite undercut faces, said surfaces and faces being sized for alignment with corresponding surfaces and faces of such T-slot,

whereby on installation within such T-slotted bed or boltster plate, the said arcuate faces of the piston rod will be supported by such bore to resist forces applied sidewardly.

4,695,048

APPARATUS FOR SEPARATING DOCUMENTS

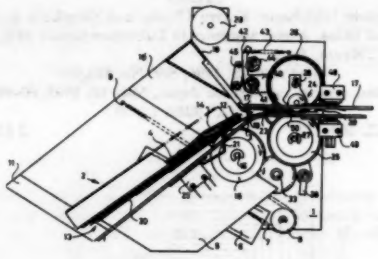
Horst Görner, St. Georgen; Walter Furstwängler, and Walter Usbeck, both of Villingen-Schwenningen, all of Fed. Rep. of Germany, assignors to Mannesmann Kienzle GmbH, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,153

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1985, 3503168

Int. Cl.[4] B65H *3/52*

U.S. Cl. 271—122 **6 Claims**



1. An apparatus for separating documents, comprising storage means for a stack of documents, spaced apart first and second rollers having circumferential surfaces and parallel axes, said rollers defining a gap therebetween, said second roller mounted on an axle, means for feeding the documents from said storage means into said gap, said first roller driven to rotate so as to convey the documents through said gap, said second roller driven so that said surfaces of said rollers at said gap move in opposite directions, said second roller holding back any document placed on the document conveyed by said first roller, said second roller mounted pivotable about a pivot axis, wherein the width of said gap is adjustable in accordance with the thickness of the document conveyed through said gap, a guide roller immediately downstream of said gap, and a support member for connecting said guide roller to said axle of said second roller, said guide roller mounted to project slightly beyond the periphery of said second roller so as to make contact with a document conveyed through said gap and to slightly widen said gap during the conveyance of a document through said gap.

4,695,049
EXERCISE DEVICE

Jan A. Ciemiega, 1817 Beloit St., Apt. 10, Los Angeles, Calif. 90065

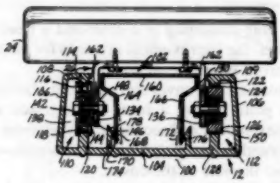
Filed Sep. 11, 1986, Ser. No. 906,142
Int. Cl.[4] A63B 5/00
U.S. Cl. 272—67 20 Claims

1. An exercise device comprising:
first and second handles sized and shaped for manual grasp;
a threaded rod secured to said first handle;
first and second nuts threadedly engaged with said threaded rod and rotatably secured to said second handle; and
a spring engaged with both said first and second nuts so as to produce force on said first and second nuts in a direction along said threaded rod in order to produce rotative friction on said nut with respect to said threaded rod so that when said handles are manually grasped and rotated with respect to each other, said nuts rotate on said threaded rod and the friction therebetween provides resistance to relative rotation of said first and second handles.

4,695,050
EXERCISE ROWING MACHINE

David B. Smith, Mercer Island, and Randolph F. Miller, Mt. Vernon, both of Wash., assignors to Precor Incorporated, Redmond, Wash.

Filed Sep. 16, 1985, Ser. No. 776,400
Int. Cl.[4] A63B 69/06
U.S. Cl. 272—72 18 Claims

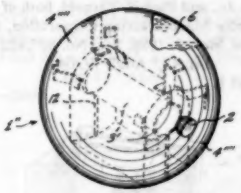


1. An exercise apparatus, comprising:
a frame including an elongaged, generally tubular beam assembly, comprising:
(a) a first component having a bottom portion forming the bottom exterior of the beam assembly, side portions forming the exterior sides of the beam assembly and top portions extending laterally inwardly from the side portions to form exterior top flanges of the beam assembly and to define a gap therebetween extending longitudinally of the beam assembly;
(b) a second component cooperatively engageable and disengageable with the first component of the beam assembly, said second component being generally U-shaped in cross section and defined by:
(i) a top wall extending between the top portions of the first component of the beam assembly to, in conjunction with the top portion of the first component, substantially close off the top section of the beam assembly and define elongated entrance openings in the form of a pair of narrow slots disposed in spaced parallel relationship to each other and extending along the length of the beam assembly; and,
(ii) laterally spaced apart side walls extending downwardly from the lateral edge portions of the top wall; and,
(c) means for detachably engaging the lower portions of the side walls of the second component of the beam assembly to the bottom portion of the first component whereby the second component of the beam assembly and the bottom portion of the first component cooperatively form a closed, hollow structure extending longitudinally of the beam assembly;
internal track means disposed within the interior of the beam assembly, said internal track means including a pair of guide rails disposed outwardly and on opposite sides of the second component of the beam assembly and positioned in spaced parallel relationship to each other;
a seat; and,
a carriage assembly having an underframe for supporting the seat, said underframe extending downwardly through said beam assembly entrance openings and into the interior of said beam assembly, and a plurality of roller means rotatably secured to said underframe and engageable with said guide rails for guiding the carriage assembly for travel along the length of the beam assembly.

4,695,051
COLLAPSIBLE DUMBBELLS

Robert E. Jenison, Rte. 1, Box 2149, Lopez, Wash. 98261

Continuation-in-part of Ser. No. 639,265, Aug. 9, 1984, abandoned. This application Jul. 3, 1985, Ser. No. 751,751
Int. Cl.[4] A63B 11/00
U.S. Cl. 272—122 5 Claims



1. In combination, a hollow, flexible, collapsible, fillable hand held exercise device having two enlarged chambers at opposite ends of a centrally located axially balanced handle portion and a hollow, flexible, collapsible, fillable horseshoe cross section, elongated lengthwise of said handle portion, forming an internal passage communicating with both of said enlarged chambers and encircling at least 180 degrees of said handle portion leaving space for a hand between the inner wall of said horseshoe cross section and said handle portion.

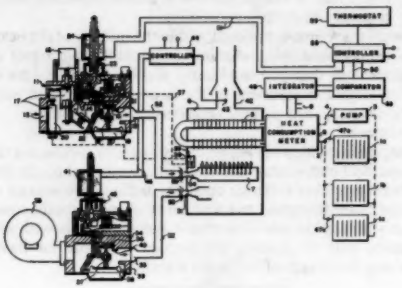
4,695,052
HOT WATER HEATING SYSTEM USING A HEAT CONSUMPTION METER

Hendrikus Berkhof, Emmen, Netherlands, assignor to Honeywell B.V., Amsterdam, Netherlands

Filed Nov. 10, 1986, Ser. No. 928,944
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1985, 3544411
Int. Cl.[4] G05D 23/00
U.S. Cl. 237—8 R 5 Claims

1. A hot water heating system comprising
a heat consumption meter for providing an electrical output signal proportional to the amount of heat being supplied to the heating system and
a controller means which controls the heating power of a heat generator, said output signal being supplied as an input signal to said controller, wherein said controller means includes an integrator having a timer and being connected to receive the output of said heat consumption meter, said integrator measuring the amount of heat consumed during a predetermined period of time and storing a corresponding signal and

a comparator connected to said integrator, with said comparator comparing the measured amount of currently supplied heat with an amount of heat measured during a



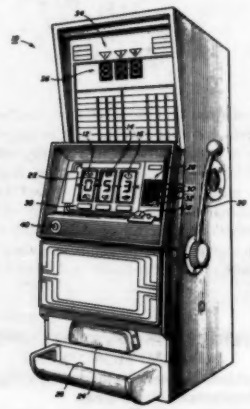
preceding period of time of equal length and from this comparison deriving a control signal for controlling the heating power of the heat generator.

4,695,053

GAMING DEVICE HAVING PLAYER SELECTABLE WINNING COMBINATIONS

Hilario Vazquez, Jr., and Paul R. Yarnold, both of Chicago, Ill., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Filed Mar. 7, 1986, Ser. No. 837,422
Int. Cl.[4] A63B *71/04*
U.S. Cl. 273—143 R **10 Claims**



1. In a gaming device of the type having means for generating a random combination of symbols, means defining a plurality of winning combinations of symbols and means resonsive to said random combination generating means and to said winning combination defining means for providing an indication of a win whenever the generated random combination corresponds to one of said winning combinations, the improvement comprising:

player operated means for generating a player selected winning combination;

means responsive to said player selected combination for providing an indication of a win whenever the generated random combination corresponds to said player selected winning combination; and

wherein said random combination generating means includes a plurality of rotatable reels, each reel having disposed thereon a plurality of first symbols corresponding to symbols defining said winning combination and second symbols corresponding to symbols defining said player selected said winning combinations and said second symbols being different from said first symbols.

4,695,054

GOLF CLUB

Timothy F. Tunstall, P.O. Box 434, Springfield, Mass. 01101

Filed Mar. 10, 1986, Ser. No. 837,956
Claims priority, application Ireland, Mar. 13, 1985, 643/85
Int. Cl.[4] A63B *53/06*
U.S. Cl. 273—171 **1 Claim**

1. In a golf club consisting of a shaft and a head interconnected by a hosel, the improvement in means for modifying the club to a preferred weight level comprising:

the head consisting of a cover and a contact plate and a base,

the contact plate having a front striking face and being vertically-extending and securable to the cover for defining cooperantly therewith a closed upwardly-projecting recess from the sole of the cover,

the base having a forward toe and a rearward heel relative to the longitudinal axis of the head and being nestably receivable within the recess,

an extension of the longitudinal axis of the shaft passing through the base between the toe and heel,

the base having spaced vertically-extending downwardly-projecting closed recesses in the respective toe and heel,

a screw in locked interengagement with and vertically extendable through and rotatable relative to the base between the recesses and threadedly engageable with the cover for releasably interengaging the cover and base,

a barrel and a plurality of weight discs being selectively receivable in each of the recesses for weighting the respective toe and heel,

each barrel being selectively receivable in its recess with the respective weight discs disposed upwardly thereof for the weighting of the upper region of the base or with the respective weight discs disposed downwardly thereof for the weighting of the lower region of the base,

a compressible member being receivable in each respective barrel and disposable over the respective weight discs and barrel in maintaining the respective weight discs and barrel in tight relationship as to the base,

the front striking face of the contact plate forwardly of the screw defining a preferred point of initial contact of the plate with a ball.

4,695,055

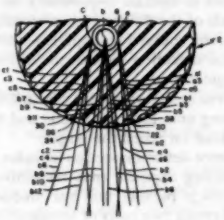
ILLUMINATED TRANSLUCENT GOLF BALL

Nelson F. Newcomb, and Nelson F. Newcomb, Jr., both of Mirror Lake, N.H. 03853

Continuation-in-part of Ser. No. 794,668, Nov. 4, 1985, abandoned. This application Jan. 6, 1986, Ser. No. 816,236

Int. Cl.[4] A63B *43/06*

U.S. Cl. 273—213 7 Claims



1. A solid golf ball comprising a body in the shape of a sphere and made of a translucent plastic material, the outer surface of said sphere including closely spaced apart dimples, said ball being provided with a permanent diametrical hole extending therethrough for receiving and retaining a cylindrical chemiluminescent light stick having a diameter corresponding generally to the diameter of said diametrical hold so that the visibility of said ball in the dark will be enhanced when an activated chemiluminescent light stick as aforesaid is retained therein and the light from said stick is further enhanced by the diffused light passing through said dimples.

4,695,056

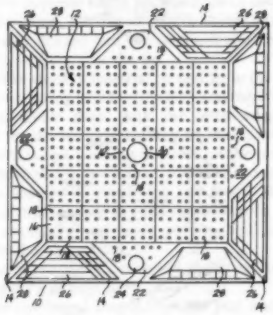
VARIABLE SURFACE BOARD GAME

Donald P. Cornelson, Seattle, and Jess W. Carlson, Everett, both of Wash., assignors to C & C Concepts, Inc., Seattle, Wash.

Filed Sep. 23, 1985, Ser. No. 779,165

Int. Cl.[4] A63F *3/02, 3/00*

U.S. Cl. 273—262 26 Claims



1. A multiple player competing board game, comprising:

a playing board having a central portion comprising a pattern of areas, each said area including a plurality of position marks, and player start positions on each side of the board bordering said central portion; said player start positions constituting entries into the central portion;

a plurality of property identifying markers that randomly cover a plurality of position marks;

a plurality of obstacle identifying markers that randomly cover a plurality of position marks;

at least one position marker for each player; and

a plurality of playing surface determining cards, each having a front side and a back side, with a first group of said cards having property identifying indicia on their front sides, with a second group of said cards having obstacle identifying indicia on their front sides, and with a third group of said cards having other identifying indicia on their front sides, whereby the cards can be shuffled or otherwise mixed with their face sides concealed, and then dealt face down on the areas of the central portion of the playing board, and then turned over, and each card of the first group of cards can be replaced with a property marker corresponding to property identified on the card, and each card of the second group of cards can be replaced by an obstacle marker corresponding to an obstacle on the card, and wherein the third group of cards are merely removed from the board, so as to expose for use in the play of the game the position marks on the areas from which such cards are removed.

4,695,057

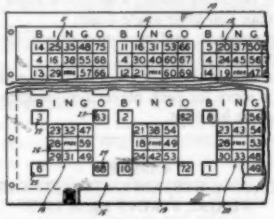
BINGO GAME MARKING TEMPLATE

Carol A. McCullen, 459 San Juan, St. Charles, Mo. 63303

Filed May 22, 1985, Ser. No. 736,269

Int. Cl.[4] A63F *3/06*

U.S. Cl. 273—269 5 Claims



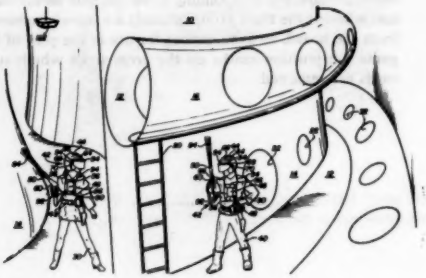
1. In combination a bingo sheet having a rectangular block of numbers thereon, each number in the block being disposed in a rectangular space defined by horizontal and vertical limits, a template for use by a player in playing bingo games, the template being adapted to overlie the rectangular block of numbers on the bingo sheet, the template being readily removable from the sheet, the template being larger than the size of the rectangular block of numbers so as to provide marginal portions outside of the block of numbers, and having, within the rectangular area corresponding in size to the size of the rectangular block of numbers, openings cut out to expose only the numbers on the bingo sheet that are required to be used in the game being played, and having uncut portions that are at least somewhat opaque to obscure the numbers that are not being played in that particular game, the openings in the template having horizontal and vertical edges corresponding to the edges of the numbers of the blocks' horizontal and vertical openings, the openings being of sufficient size to admit indicating means to be placed on the bingo sheet by the player, the template being separate from and readily removable from the sheet to leave the indicating means visible on the sheet, an edge of each opening being connected with the margin of the template so that the template can remain integral.

4,695,058

SIMULATED SHOOTING GAME WITH CONTINUOUS TRANSMISSION OF TARGET IDENTIFICATION SIGNALS

George A. Carter, III, Dallas, and James L. Dooley, Arlington, both of Tex., assignors to Photon Marketing Limited, Dallas, Tex.

Continuation of Ser. No. 575,332, Jan. 31, 1984, abandoned. This application Jan. 28, 1986, Ser. No. 822,966
Int. Cl.[4] F41J 5/00
U.S. Cl. 273—311 31 Claims



1. An amusement shooting game for play by a plurality of players, wherein players shoot at each other while being shot at on a battlefield comprising:

means carried by each player for generating and transmitting continuously in a wide-angle beam directed outwardly from each player a coded signal unique to each player;

means carried by each player for receiving said transmitted coded signal being transmitted by all of the players, said means for receiving having a reception angle substantially smaller than said wide-angle beam;

means responsive to said receiving means for detecting a transmitted coded signal; and

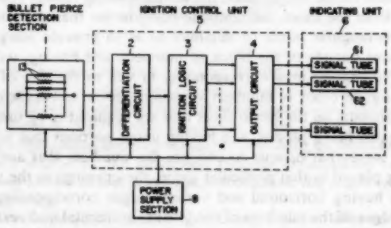
means for counting the number of detected coded signals to provide a score for each player representing the number of players he has shot.

4,695,059

HIT INDICATING SYSTEM IN TOWED TARGET FOR AERIAL FIRING PRACTICE

Masatoshi Yamashita, and Norio Tsunoda, both of Utsunomiya, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 28, 1984, Ser. No. 645,125
Int. Cl.[4] F41J 5/04, 9/10
U.S. Cl. 273—360 1 Claim



1. In a target for firing practice to be towed by an aircraft or the like, a hit indicating system comprising:

a bullet pierce detection section installed over parts of the target where bullets are expected to hit and comprising a plurality of parallel connected resistance circuits respectively constituting bullet pierce detecting elements breakable by a piercing bullet;

a differentiation circuit responsive to variations in the combined resistance value of the bullet pierce detection section for generating pulse signals;

an indicating unit comprising a plurality of indicating elements;

a logic circuit for generating outputs for causing said indicating elements to operate sequentially on the basis of the pulse signals of the differentiation circuit;

an electric power source for supplying electric power to the bullet pierce detection section, the differentiation circuit and the logic circuit;

the bullet pierce detection section, the differentiation circuit, the indicating unit, the logic circuit and the power source being installed on board the target;

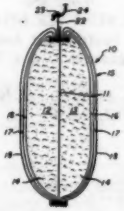
said bullet pierce detection section includes two bus conductors connecting opposite ends respectively of said resistance circuits in parallel, said bus conductors have opposite ends forming two pairs of terminals connected to said differentiation circuit, whereby bullet pierce detection of the system is unaffected by a single break at one part of the bus conductors, respectively, and bullet pierce detection of the system is affected by a double break at two parts of the bus conductors, respectively, only by failure of the resistance circuits between the double break.

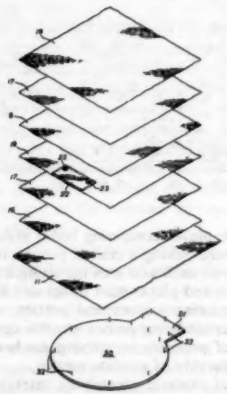
4,695,060

REVERSIBLE ARCHERY TARGET

J. Cole Pilgrim, 3706 Clear Falls Dr., Kingwood, Tex. 77339

Filed May 2, 1986, Ser. No. 858,956
Int. Cl.[4] F41J 3/00
U.S. Cl. 273—404 21 Claims





1. An archery target comprising

a first layer of burlap,
a second layer of woven polypropelyne,
a third layer of woven polypropelyne,
a fourth layer of woven polypropelyne which is a centrally disposed divider,
a fifth layer of woven polypropelyne,
a sixth layer of woven polypropelyne,
a seventh layer of burlap,
said third and fifth layers forming adjacent compartments at each side of said fourth layer, and
a mass of fibrous material disposed in said compartments between said third and fourth layer and said fourth and fifth layer,
said layers being stitched together about the margins thereof.

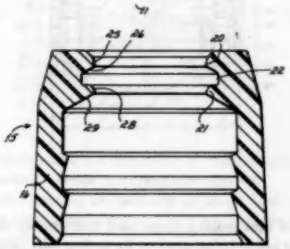
19. A method of manufacturing an archery target comprising the steps of;
providing an assembly jig having a generally round flat configuaration with a rectangular neck portion extending outwardly on one end and a plurality of thin rodlike pointed projections spaced about the periphery of the jig with the points facing upwardly to removably receive and maintain layers of material in a predetermined position on the jig,
precutting a plurality of sheets of material to a size slightly larger than the periphery of the jig,
precutting a sheet of material to a rectangular shape and installing grommets in two opposed corners thereof,
placing a first sheet of material on said jig in the approximate center with the outer edges extending beyond the periphery of the jig and said neck portion and pressing it down on the projections,
placing a second and third sheet of material on said jig in the approximate center overlaying said first sheet with the outer edges extending beyond the diametric periphery of the jig excluding said neck portion and pressing them down on the projections,
placing a fourth sheet of material on said jig in the approximate center overlaying said third sheet with the outer edges extending beyond the diametric periphery of the jig excluding said neck portion and pressing it down on the projections,
placing the rectangular sheet of material in a position diametrically opposed to the neck portion of said jig overlaying said second, third, and fourth sheets with the grommeted edge inward and the opposed edge extending beyond the periphery of the jig,
placing a fifth sheet of material on said jig in the approximate center overlaying said fourth sheet and the inward edge of the rectangular sheet with the outer edges extending beyond the diametric periphery of the jig excluding said neck portion and pressing it down on the projections,
placing a sixth and seventh sheet of material on said jig in the approximate center overlaying said fourth sheet with the outer edges extending beyond the diametric periphery of the jig excluding said neck portion and pressing them down on the projections,
cutting the edges of the overlayed sheets extending beyond the periphery of said jig,
sewing the overlayed sheets together just inside the outer periphery excluding said neck portion to form a generally bag-like enclosure with an open neck for receiving a filler material,
removing the bag-like enclosure from the jig by lifting it from the projections and turning the bag-like enclosure inside out, and thereafter said first sheet becoming a central divider sheet extending partially outwardly from the open neck and dividing the bag-like enclosure into two compartments on each side thereof,
stuffing a predetermined volume of filler material into each compartment of the bag-like enclosure,
compressing the stuffed bag-like enclosure to a predetermined thickness and while under compression sewing the layers of material at the open neck together to securely close the opening and completely enclose the filler material within the bag-like enclosure.

4,695,061

VALVE STEM SEAL

Edward O. Meisner, Elkhart, Ind., and Charles F. Romine, Madison, Conn., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Aug. 29, 1985, Ser. No. 770,782
Int. Cl.[4] F01L *3/08*; F16J *15/32*
U.S. Cl. 277—27 **3 Claims**



1. For a valve stem having an oil side and a valve guide side, a valve stem seal between said oil and said guide, said seal comprising:
an elastomeric sleeve surrounding said stem and guide, said sleeve having a lower portion surrounding said guide in sealing relation thereto,
said sleeve having on the internal surface thereof at least one land tightly engaging the surface of said stem,
said land having a first frustoconical surface on the oil side thereof,
said land having a second frustoconical surface on the guide side thereof,
the angle between said second frustoconical surface and said valve stem being greater than the angle of said first frustoconical surface and said valve stem, whereby the sum of the oil flows caused by reciprocation of the valve stem results in an overall oil flow toward said guide due to said angle between said first frustoconical surface and said valve stem creating a greater hydrodynamic lift-off during the stroke of said valve stem toward said guide than the hydrodynamic lift-off created by said angle between said second frustoconical surface and said valve stem during the stroke of said valve stem away from said guide.

4,695,062

PRESSURE RELIEVING SEALING RINGS FOR ROTATING ELEMENTS

Peter Dreschmann, Dittelbrunn, and Wilhelm Walter, Reith, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

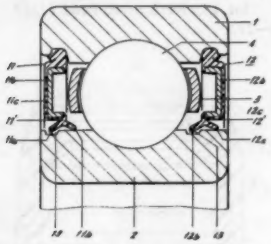
Filed Jul. 25, 1986, Ser. No. 890,002
Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 3528961
Int. Cl.[4] F16J *15/32, 15/48*
U.S. Cl. 277—27 **13 Claims**

1. Means defining a space having first and second sealing rings at opposite sides thereof;
said means including first and second sections mounted for relative rotation therebetween, with one of said sections being disposed inside the other of said sections;
each of said sealing rings being secured to said first section and having annular resilient lip means including a sealing lip biased to engage seat means on said second section;
said sealing lips and said seat means being disposed so that in the even pressures within and without said space are unequal, at a given time the sealing lip of only one of said

sealing rings separates from said seat means to equalize pressures within and without said space;

each of said sealing rings having an interior side facing said space and being subjected to pressure existing within said space;

each of said sealing rings having an exterior side facing away from said space, with both of said exterior sides being subjected to pressures that are equal;



for each of said sealing rings, said resilient lip means at its free end being bifurcated to form first and second lips;

for each of said sealing rings, one of said first and second lips constituting said sealing lip, and the other of said first and said second lips constituting a non-sealing lip that is disposed free of engagement with said first and second sections.

4,695,063

RADIAL SHAFT SEAL RING WITH BACKFEED RIBS AND DAMMING RIBS

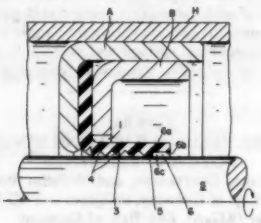
Wolfgang Schmitt, Viernheim, and Hans Forch, Birkenau, both of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr, Fed. Rep. of Germany

Filed Nov. 7, 1985, Ser. No. 796,003

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1984, 3440797

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—134 **6 Claims**



1. A radial shaft seal ring comprising an annular sealing lip of a polymeric material which by a peripheral sealing strip bears resiliently on the shaft, hydrodynamically acting backfeed ribs on the side of the sealing strip remote from the pressure, an internally cylindrical annular projection on the side facing the sealed medium, and a radial clearance between the interior of the annular projection and the shaft, the annular projection being united with the sealing strip in a bending-resistant manner, and damming ribs which have leading surfaces for the sealed medium and are uniformly distributed over the periphery protruding from the interior of the annular projection, characterized in that the leading surfaces, viewed at right angles to the axis of rotation of the shaft, make an acute angle with the shaft surface and extend parallel thereto.

4,695,064

PISTON RING ASSEMBLY AND EXPANDER

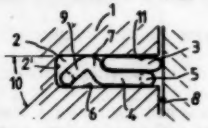
Bert Brauers, and Martin Morsbach, both of Burscheid, Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 839,171

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530175

Int. Cl.[4] F16J *9/06*

U.S. Cl. 277—139 **4 Claims**



1. A piston-and-ring assembly including a generally cylindrical piston having an axis and a circumferential groove having a bottom and two radial flanks forming opposite sides of the groove; an expander spring ring accommodated in said groove and including a plurality of generally radially extending tongues arranged in a circumferential series; each tongue having a radially inward end and a leg portion extending at an angle other than zero from a respective said tongue to one of said flanks; each said leg portion continuing in an extension provided with a free terminus; two oil scraper annular laminae situated in said groove and being supported axially by said tongues and being abutted radially by said leg portions, the improvement wherein said extension of each said leg portion is oriented thereto at an inclination; each said extension being oriented toward the other of said flanks and being of a length such that said free terminus reaches substantially to the other of said flanks.

4,695,065

KEYLESS CHUCK FOR ROTARY TOOL

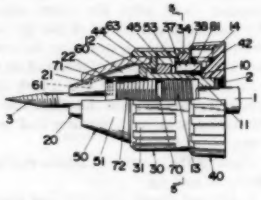
Teruaki Komatsu, Hikone; Kiyoshi Kobayashi, Nagahama; Kunihiko Tatsu, and Shoichi Shibata, both of Hikone, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Dec. 24, 1986, Ser. No. 946,067

Claims priority, application Japan, Jan. 21, 1986, 61-10834

Int. Cl.[4] B23B *31/12*

U.S. Cl. 279—60 **9 Claims**



1. A chuck for a rotary tool comprising:

a chuck body having a longitudinal axis and adapted to be connected to a drive spindle of a drive source for being driven to rotate about the axis;

a set of gripping jaws drivingly connected to said chuck body and releasably holding a tool bit to be driven to rotate by said chuck body;

a handle ring rotatably disposed on the chuck body and operatively connected to said gripping jaws; said handle ring being relatively rotatable with respect to the chuck body for displacing the gripping jaws into tool-gripping relation with the tool bit when it is rotated relative to the chuck body in one direction and displacing the gripping

jaws out of tool-gripping relation with the tool bit when rotated in the opposite direction relative to the chuck body, the rotating direction of the handle ring for displacing the gripping jaws into tool-gripping relation with the tool bit being corresponding to the reverse rotating direction of the chuck body for removing the tool bit from a workpiece;

clutch means for rotatively fixing the handle ring to the chuck body when the chuck body is driven to rotate in the reverse direction of removing the tool bit from the workpiece such that the handle ring is forced to rotate together with the chuck body in the direction of displacing the gripping jaws into tool-gripping relation with the tool bit;

control means acting on said clutch means to functionally move the same between an active position where said clutch means is capable of rotatively fixing the handle ring to the chuck body and an inactive position where said clutch means is deactivated to release the handle ring from the chuck body for permitting the handle ring to be freely rotatable in relation to the chuck body.

4,695,066

CHIP-SHEDDING HAMMER-DRILL CHUCK

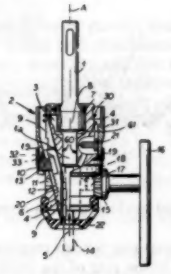
Günter H. Röhm, Heinrich-Röhm-Str. 50, D-7927 Sontheim, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,891

Claims priority, application Fed. Rep. of Germany, Dec. 15, 1984, 8436751

Int. Cl.⁴ B23B *31/04*

U.S. Cl. 279—62 **4 Claims**



1. A chuck comprising:

a chuck body having an outer circumferential surface and formed with

a forwardly open hole defining an axis and normally receiving a drill bit projecting axially forward from the body,

a plurality of angularly generally equispaced guide bores extending at an acute angle to the axis and having inner front ends opening in the hole at the front portion thereof and outer rear ends opening on the outer surface, and

respective chip-shedding passages opening radially inward into the guide bores between the inner and outer ends thereof and radially outward on the outer surface;

respective jaws displaceable in the bores and having front ends engageable with a bit in the hole and radially outwardly directed teeth; and

an adjustment ring engaged around the body and fitting with the teeth of the jaws, whereby rotation of the ring in one direction advances the jaws in the body and rotation in the opposite direction retracts the jaws for respectively clamping and unclamping the drill bit in the front portion.

4,695,067

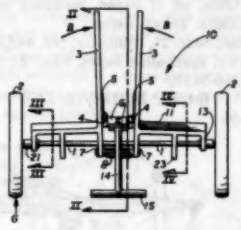
WHEELED ARTICLE CARRIER

Robert P. Willey, 8835 Phoenix Ave., Fair Oaks, Calif. 95628

Filed Apr. 3, 1986, Ser. No. 847,912

Int. Cl.⁴ B62B *1/14*

U.S. Cl. 280—47.22 **25 Claims**



17. An article carrier, comprising in combination:

an axle having wheels at extremities thereof,

frame means bearing on said axle adjacent said wheels,

said frame means including a clamp means held by a spring below said axle,

clearance slots on said clamp means through which said axle passes, and said clamp means includes a connecting member above the axle about which said clamp means pivots for grasping the article.

4,695,068

FRONT AND REAR WHEEL STEERING DEVICE

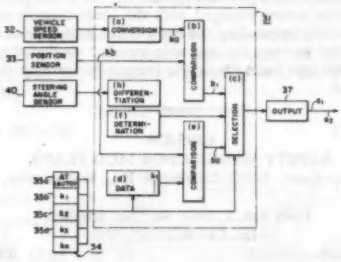
Yoshimichi Kawamoto; Yoshimi Furukawa; Tetsuro Hamada, and Mitsuya Serizawa, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1986, Ser. No. 822,000

Claims priority, application Japan, Jan. 24, 1985, 60-011821; Jan. 24, 1985, 60-011822; Jan. 24, 1985, 60-011823; Jan. 24, 1985, 60-011824; Jan. 24, 1985, 60-011825; Jan. 24, 1985, 60-011826

Int. Cl.⁴ B62D *6/00*

U.S. Cl. 280—91 **13 Claims**



1. A front and rear wheel steering device control for a vehicle for variably controlling the steering angle rtio of rear wheels relative to front wheels according to certain conditions, comprising:

storage means for storing data of at least one fixed rear wheel steering ratio and a variable rear wheel steering angle ratio whch is a function of vehicle speed;

actuator means for achieving a rear wheel steering angle ratio selected from the data stored in the storage means;

manual switching means which selects the fixed rear wheel steering angle ratio when activated and selects the variable rear wheel steering angle ratio when deactivated; and

a limiting means for deactivating the action of the manual

switching means when the change rate of vehcle speed is greater than a certain value.

4,695,069

STEERING SYSTEM FOR REAR WHEELS

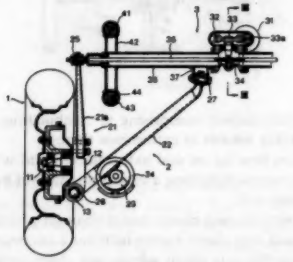
Ryogo Kurokawa; Fusami Oyama, both of Gunma, and Akira Takahashi, Ohta, all of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,350

Claims priority, application Japan, Mar. 22, 1985, 60-58101; Mar. 22, 1985, 60-58102

Int. Cl.[4] B62D *5/10, 7/00*

U.S. Cl. 280—91 **19 Claims**



1. A steering system for a motor vehicle having a body comprising:

a cross-member attached to the body of the motor vehicle in the transverse direction;

a movable member slidably disposed on the cross-member so as to be moved in the transverse direction;

an outer control arm rotatably connected at one end thereof on an end of the movable member so as to swing in a vertical plane;

a shaft secured to the outer control arm;

a rear wheel of the vehicle rotatably mounted on said shaft;

an inner control arm rotatably supported at an end thereof on the cross-member so as to swing in a vertical plane;

a kingpin rotatably connecting other ends of both said control arms with each other so that said outer control arm is swingable in a horizontal plane;

suspension means engaged with the inner control arm for elastically suspending the body of the motor vehicle; and

means for moving the movable member so that the outer control arm turns about the kingpin for turning the rear wheel.

4,695,070

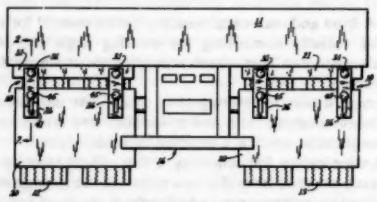
SAFETY HANGER FOR MUD FLAPS

Ronald A. Knox, 13262 Edinburgh Dr., Westminster, Calif. 92683

Filed Jun. 2, 1986, Ser. No. 869,235

Int. Cl.[4] B62D *25/18*

U.S. Cl. 280—154.5 R **5 Claims**



1. In combination with a road vehicle which travels on wheels;

a. at least two non-stretchable bars, each having a first end for securing to and depending from said vehicle in generally parallel relation at a position rearwardly of at least one of said wheels relative to the normal direction of travel of said vehicle;

b. each of said non-stretchable bars having an elongated slot formed therein;

c. at least two stretchable bars, each having first and second ends, with means on said first ends for securing to said vehicle in proximate relation to said first ends of said non-stretchable bars, each of said stretchable bars having a hole formed in the second end thereof;

d. a mud flap having at least two holes disposed adjacent an upper edge thereof;

e. a pin disposed and through said slot, one of said holes on said mud flap and said hole on said stretchable bar so that said pin is capable of sliding along said slot, said mud flap being supported by said stretchable bars in the normal position with each of said pins adjacent the upper end of its respective slot, said mud flap further being guided by said pins within said slots upon downward force being applied to said mud flap, and guided for return to its normal position under the return bias of said stretchable bars when said force is removed.

4,695,071

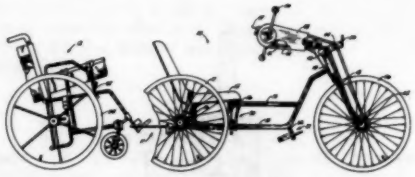
HAND POWERED TRICYCLE HAVING A WHEELCHAIR HITCH

Fred E. Johnston, R.F.D. Box 83, Cleghorn, Iowa 51014

Filed Oct. 8, 1986, Ser. No. 916,691

Int. Cl.[4] B62K *27/00;* **B60D** *1/00*

U.S. Cl. 290—204 **5 Claims**



1. A hand operated cycle apparatus comprising:

a cycle frame;

a pair of spaced apart rear wheels rotatably attached along a horizontal axis to the rear of the cycle frame;

a yoke pivotally attached to the front of the cycle frame;

a front wheel rotatably attached to said yoke;

drive means for selectively rotating said front wheel;

pedal means attached to an upper portion of said yoke and to said drive means for selectively turning said drive means by hand;

a seat operably attached to a rear portion of said cycle frame;

brake means operably attached to said cycle frame for selectively holding each of the rear wheels form rotating with respect to the frame;

footrest means for supporting the feet of a cycle user;

a wheelchair having wheelchair frame and a seat, a pair of rear wheels, a pair of front wheels and footrests connected to said wheelchair frame;

a wheelchair hitch connected to the rear of said cycle frame, said hitch comprising a somewhat horizontally disposed rod extending transverse to the direction of forward movement of said cycle frame and a pair of spaced apart locking members connected at one end to said rod and extending in the direction of forward movement of said cycle frame whereby the footrests of said wheelchair can be placed below said locking members to prevent the wheelchair from being dislodged from said hitch when said wheelchair is being towed behind said cycle frame.

4,695,072

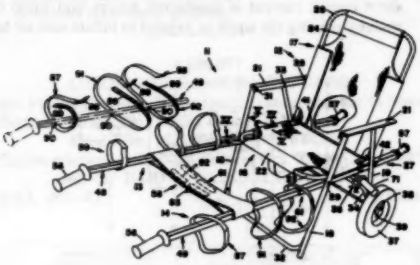
ATHLETE CARRIER

Royce L. Brooks, Benicia, Calif., assignor to Norman D. Koerner, Benicia, Calif.

Continuation-in-part of Ser. No. 750,993, Jul. 2, 1985, which is a continuation of Ser. No. 349,913, Feb. 18, 1982, abandoned. This application Nov. 15, 1985, Ser. No. 798,744

Int. Cl.[4] A47C *4/28*

U.S. Cl. 280—650 7 Claims



1. Apparatus for manually transporting an injured person comprising:

a chair having a seat, a backrest and front and rear leg members, said seat and backrest and front and rear leg members being foldable relative to each other from a chair configuration to a relatively compact storage configuration,

first and second ground wheels mounted on said rear leg members at opposite sides of said chair,

first and second attachment elements secured to opposite sides of said seat,

first and second spaced apart parallel front carrier arm segments received within said attachment elements and extending forwardly therefrom and first and second spaced apart parallel rear carrier arm segments extending rearwardly therefrom, and wherein said rear carrier arm segments extend a shorter distance from said chair than said front carrier arm segments,

means for releasably securing said front carrier arm segments and said rear carrier arm segments to said attachment elements,

a handle secured to the end of each of said carrier arm segments,

a disconnectable cross strap extending between said front carrier arm segments at a location spaced forwardly from said chair, and

first and second pluralities of straps attached to said first and second front carrier arm segments respectively for securing at least one of the legs of an injured person to one of said front carrier arm segments with such leg in a extended position, at least one of said straps at each of said front carrier arm segments being situated between said chair and said cross strap and at least one of said straps at each of said front carrier arm segments being situated between said cross strap and said handle.

4,695,073

TOE AND CAMBER ADJUSTING SYSTEM

Craig R. Pettibone, Lafayette, and Jimmy D. Berry, Longmont, both of Colo., assignors to Specialty Products, Inc., Longmont, Colo.

Filed Apr. 11, 1986, Ser. No. 850,948

Int. Cl.[4] B62D *17/00*

U.S. Cl. 280—690 16 Claims

1. Apparatus for adjusting the toe and camber of a normally fixed wheel of a vehicle comprising:

a vehicle having a longitudinal axis;

a wheel drum;

means for mounting said wheel drum on said vehicle for rotation about an axis extending generally perpendicular to said longitudinal axis;

a control arm having a central portion thereof operatively connected with said means for mounting said wheel drum;

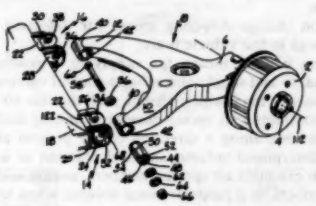
said control arm having spaced apart ends extending outwardly from said central portion;

a first bracket mounted in a fixed position on said vehicle;

said control arm having one of said ends thereof mounted in said first bracket so as to permit slight relative movement between said one end and said first bracket;

a second bracket mounted in a fixed position on said vehicle;

mounting means for mounting the other end of said control arm in said second bracket;



rotatable means in said mounting means for moving at least a portion of said other end of said control arm through an arcuate path about a relatively fixed axis extending in a direction generally perpendicular to said longitudinal axis of said vehicle for changing the angular relationship between said longitudinal axis of said vehicle and said rotational axis of said wheel drum to adjust simultaneously the toe and camber of said wheel drum to a desired position; and

means for locking said rotatable means to retain said wheel drum in said desired position.

4,695,074

VEHICLE SUSPENSION APPARATUS

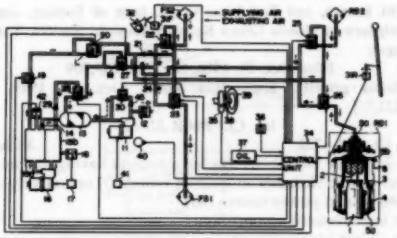
Kazuyoshi Kobayashi, Oobu; Shozo Takizawa, Okazaki; Tadao Tanaka, Okazaki; Mitsuhiko Harara, Okazaki; Yasutaka Taniguchi; Masanaga Suzumura, both of Nagoya; Minoru Tatemoto, Okazaki, and Naotake Kumagai, Aichi, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1985, Ser. No. 747,651

Claims priority, application Japan, Jun. 30, 1984, 59-98981[U]; Jul. 25, 1984, 59-112664[U]; Nov. 30, 1984, 59-182008[U]

Int. Cl.[4] B60G *11/26*

U.S. Cl. 280—707 17 Claims



1. A vehicle suspension apparatus comprising:

air spring chambers arranged between a vehicle body and respective wheels, said air chambers comprising left air chambers and right air chambers:

air supply means for supplying air to said air spring chambers through supply control valve means;

air exhaust for exhausting the air from said air spring chambers through exhaust control valve means;

control means for controlling said supply and exhaust control valve means;

said air supply means comprising a high-pressure reserve tank connected to said air spring chambers through said supply control valve means and a first compressor for supplying compressed air to said high-pressure reserve tank;

said air exhaust means comprising a low-pressure reserve tank connected to said air spring chambers through said exhaust control valve means;

said first compressor of said air supply means being provided with a suction port connected to said low-pressure reserve tank;

position change detecting means for detecting a position change in the vehicle body;

position control means for supplying a position control signal to said supply and exhaust control valve means so as to control the position change such that the air is supplied to contracted air spring chambers, among said air spring chambers, along a direction of the positon change in a predetermined volume, and such that the air is exhausted from extended air spring chambers, among said air spring chambers, in a predetermined volume when said position change detecting means detects a position change signal;

communicating means for causing left air spring chambers to communicate with right air spring chambers, among said air spring chambers, through a communication control valve; and

said position control means including means for generating, in a normal vehicle position state, a communication control valve control signal to open said communication control valve so as to cause said left air spring chambers to communicate with said right air spring chambers; for generating a communication control signal to close said communication control valve when said position change detecting means detects the position change signal, and, at the same time, supplying a control signal to said supply and exhaust control valves so as to control the position change such that the air is supplied to contracted air spring chambers, among said air spring chambers, along a direction of the position change in a predetermined volume, and exhausted from extended air spring chambers, among said air spring chambers, in a predetermined volume, as well as supplying a control signal to said communication control valve to open said communication control valve when the position change of the vehicle body is detected, by said position change detecting means, to be decreased below a predetermined level after the control signal for controlling the position change is generated.

4,695,075

AIR BAG DEVICE FOR VEHICLES

Koichi Kamiji, and Toshikazu Ohya, both of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 16, 1985, Ser. No. 787,909

Claims priority, application Japan, Oct. 16, 1984, 59-156221[U]

Int. Cl.[4] B60R *21/12*

U.S. Cl. 280—735 **3 Claims**

1. In an air bag device (1) for a vehicle having an electric power source (1*a*), and an ignition switch (7) operatively connected to said power source (1*a*),

an improvement comprising:

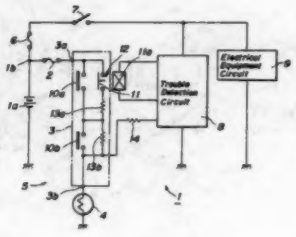
an air bag trigger circuit (5) substantially directly connected to said power source (1*a*),

wherein:

said trigger circuit comprises an impact sensing circuit (3) and an air bag inflation squib (4) adapted for expanding to inflate an air bag and connected in series to said sensing circuit (3);

said sensing circuit (3) including an impact sensor (10*a*, 10*b*) adapted to close when the vehicle is subjected to an impact of a larger magnitude than a predetermined value and a combination of a shunt resistor (13*a*, 13*b*) and switch means (12) interconnected in series, said combination being connected in parallel to said impact sensor (10*a*, 10*b*), and said switch means being adapted to open and close in an interlocked manner with the opening and closing of said ignition switch (7),

such that when said impact sensor (10*a*, 10*b*) is closed, a short circuit current is conducted across said squib (4), thereby causing the squib to expand to inflate said air bag;



said air bag device further comprising a trouble detection circuit (8, 14) operatively connected to said sensing circuit (3), to check for a defective condition of said sensing circuit (3) by detecting variations in the quantity of an electric current running through said sensing circuit (3) under a condition that said ignition switch (7) is closed; and

said trouble detection circuit (8, 14) being operatively connected to said ignition switch (7), to operate under the condition that said ignition switch (7) is closed.

4,695,076

POSITIÓN ADJUSTING DEVICE FOR MOVABLE ANCHOR LATCH MECHANISM

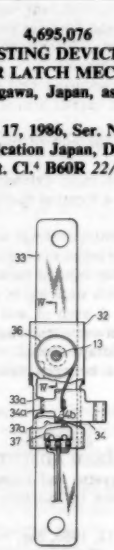
Toshiyuki Hane, Kanagawa, Japan, assignor to NSK-Warner K.K., Tokyo, Japan

Filed Dec. 17, 1986, Ser. No. 942,637

Claims priority, application Japan, Dec. 25, 1985, 60-198298

Int. Cl.[4] B60R *22/06*

U.S. Cl. 280—804 **25 Claims**



1. A position adjusting device for a movable anchor latch mechanism, comprising:

a drive means for causing a movable anchor to move between an occupant releasing position and an occupant restraining position, thereby allowing an associated web-

bing to take an occupant releasing state and an occupant restraining state selectively;

a latch mechanism for latching the movable anchor at the occupant restraining position when the movable anchor has reached the occupant restraining position;

an adjusting means for fixing the latch mechanism at a desired position; and

a release means for detecting that the adjusting means is about to be operated, whereby the movable anchor assuming the occupant restraining position is released from the occupant restraining position.

4,695,077

AUTOMOBILE INSURANCE CARD

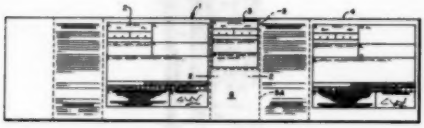
Roger Pretre, Boulogne-Ballancourt, France, assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Mar. 18, 1986, Ser. No. 840,864

Claims priority, application France, Oct. 3, 1985, 85 14597

Int. Cl.[4] B42D *15/00*, *17/00*; G09F *7/18*

U.S. Cl. 283—81 **5 Claims**



1. A label mounting system for adhering an indicia-bearing label to a transparent support for viewing the indicia therethrough, said system comprising:

a substantially planar substrate having an indicia-receiving surface area and another surface area at least co-extensive in area with said first-mentioned area; and

a label mounting stack supported upon and substantially overlying said second-mentioned area, said label mounting stack including a substantially transparent film releasably adhered on a first side thereof to said second-mentioned area and having a removable protective sheet releasably adhered to the other side thereof,

whereby the protective sheet can be removed from the transparent film, the second-mentioned area placed over the first-mentioned area to adhere the other side of the transparent film over the first-mentioned area, and the substrate released from the first side of the transparent film so as to enable adhering the first side of the transparent film to a transparent support for viewing the first-mentioned area therethrough.

4,695,078

SWIVEL PIPE JOINT

Robert W. Anderson, Stocksfield, England, assignor to Anson Limited, Gateshead, England

Filed Aug. 28, 1986, Ser. No. 901,751

Claims priority, application United Kingdom, Sep. 5, 1985, 8522047; Jan. 28, 1986, 8601972

Int. Cl.[4] F16L *17/00*

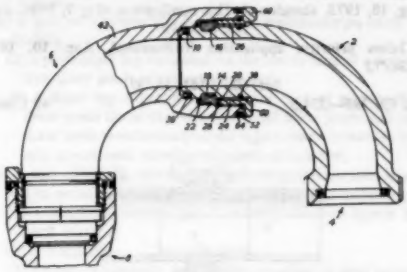
U.S. Cl. 285—98 **7 Claims**

1. A swivel joint between two lengths of pipe, said joint including a male connecting piece on an end of one length of pipe, and a cooperating female connecting piece on an end of the other length of pipe;

said male connecting piece having an axially directed cylindrical outer wall and a circumferential groove formed in said outer wall and positioned spaced from the axial end of said male connecting piece, a substantially annular split collet located within said groove and having an axially inner radial wall projecting outwardly from said outer wall to provide an abutment surface, and having an externally threaded nut rotatably mounted on said male connecting piece, said nut having an axially outer radial face adapted to react against said abutment surface of said split collet;

said female connecting piece having a cylindrical internal surface in which said axial end of said male member is received and positionally supported for swivelling movement of said male and female members relative to each other, a screw thread formed in said internal surface and corresponding with the external thread of said nut, said internal surface being recessed to receive said split collet on said male connecting piece in bearing engagement therewith;

said male and female connecting pieces having opposed,



radially spaced and axially directed surfaces thereon between which at least one substantially annular seal reacts;

whereby, on location of the male connecting piece within the female connecting piece, and, upon threading of the nut on the male connecting piece into the female connecting piece, a radial seal is effected between the two connecting pieces, and, said pieces can swivel relative to each other about the central longitudinal axis of the joint; and

a cylindrical bearing member which is a force fit on said male connecting piece, said bearing member including an annular flange extending radially of said male connecting piece and positioned between said axially outer radial face of the nut and said abutment surface of said split collet.

4,695,079

DEVICE FOR CONNECTING THE ENDS OF TWO PIPES

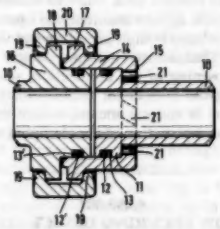
Karl Weinhold, Im Jagdfeld 43, D 4040 Neuss, Fed. Rep. of Germany

Filed Oct. 30, 1985, Ser. No. 792,953

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1984, 3440259

Int. Cl.[4] F16L *27/04*

U.S. Cl. 285—278 **5 Claims**



1. A device for connecting the ends of two pipes, comprising: an insert connectable to one pipe end and a bushing slidably and rotatably received over the end of another pipe having an annular ridge and which is configured to slidably and rotatably receive the insert, the bushing having an annular

mount at a rear face at the end away from the insert and extending radially inwardly to overlap the annular ridge on said another pipe end, wherein the annular mount has at least one throughbore therein opening onto the annular ridge for removing particles of contamination on the annular ridge when the bushing is rotated relative to the annular ridge.

4,695,080

PIPE CONNECTION

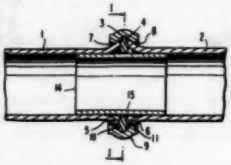
Hans Oetiker, Oberdorfstrasse 21, 8810 Horgen, Switzerland

Division of Ser. No. 815,371, Jul. 13, 1977, which is a continuation-in-part of Ser. No. 531,793, Dec. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 387,446, Aug. 10, 1973, abandoned. This application May 7, 1986, Ser. No. 858,949

Claims priority, application Switzerland, Aug. 10, 1972, 11836/72

Int. Cl.[4] **F16L** *25/00*

U.S. Cl. 285—334.5 **49 Claims**



1. A pipe connection in which pipe ends defining a pipe axis and forming joining edges along the free ends to be joined are provided with substantially axially symmetrical enlargement means having outer and inner surfaces and located within the area of the pipe ends, and which includes a circumferentially extending clamping ring means having an annular portion extending about said pipe ends and operble to be tightened by contraction in the radially inward direction to engage with said outer surfaces, said clamping ring means having a ring axis and having internal flanks at least partially defining an approximately U-shaped profile of the annular portion in a cross-sectional plane containing the axis of said clamping ring means and parallel thereto, at least one of the internal flanks of the clamping ring means and one of the outer surfaces of the enlargement means being inclined to the pipe axis in said cross-sectional plane in mutually opposite directions away from the joining edges so that in the contracted condition of the clamping ring means, the joining edges of the pipe ends are urged toward each other, and at least one substantially plastically deformable lug-shaped ear means in the annular portion of the clamping ring means, said ear means being capable of plastic deformation to thereby tighten the clamping ring means by reducing its diametric dimension and thereby securely urge said joining edges toward each other to establish a permanent pipe connection safe against unintenional opening and capable of withstanding relatively high pressures and vibrations as well as temperature fluctuations without danger of inadvertent reopening or loosening of the connection, said clamping ring means providing the permanent connection of the pipe ends upon contraction of the ear means, which can be reopened only by conscious destruction of the clamping ring means or its ear means.

4,695,081

VENT WINDOW SECURING DEVICE FOR VANS AND TRUCKS

Richard C. Boykin, 262 7th Ave., New York, N.Y. 10001

Filed Oct. 19, 1984, Ser. No. 663,661

Int. Cl.[4] **E05C** *13/02*

U.S. Cl. 292—96 **8 Claims**

1. A vent window securing device mounted on a van or truck door having a vent window frame and a vent window mounted in the frame movable between open and closed positions, a locking latch connected to the frame for holding the vent window in a closed position when in a generally horizontal position, and an interior flat vertical surface, comprising,

a flat support member secured to the interior flat surface of the door,

an elongated vertical member attached to said support member and having opposed upper and lower portions and movable between raised and lowered positions, said vertical member having vertical gear teeth formed at said lower portion,

a circular gear member having circular gear teeth engaged with said vertical gear teeth and rotatably secured to said support member,

locking means mounted at said upper portion of said elongated member for securing the vent window in the closed position, and

rotating means connected to said circular gear member for rotating said circular gear teeth so as to gear said vertical member between said raised and lowered positions,

wherein in said lowered position said locking means holds the vent window in said closed position and in said raised position said locking means releases the vent window from said closed position.

4,695,082

REVERSIBLE MORTISE LOCK

George R. Marks, 19 The Hemlocks, Roslyn Estates, N.Y. 11576

Filed Feb. 26, 1986, Ser. No. 833,026

Int. Cl.[4] **E05C** *1/12;* **E05B** *15/00*

U.S. Cl. 292—169.16 **10 Claims**

1. A reversible mortise lock comprising:

a housing having two opposed side walls and a front plate formed with a first opening,

a latch movable with respect to the housing between an extended position, in which the latch projects from the housing through the first opening in the front plate, and a retracted position, in which the latch is substantially completely withdrawn into the housing,

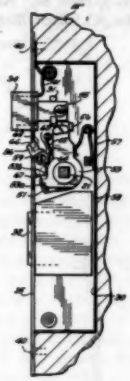
two spindle hubs within the housing independently pivotable about a fixed axis, the latch moving from said extended to said retracted position in response to pivotal movement of either spindle hub in a particular direction,

a one-piece abutment member pivotable in a first orientation between two extreme positions, the abutment member being formed so that in one extreme position the abutment member directly interferes with pivotal movement of one of the spindle hubs, but not the other, so as to prevent said one hub from causing movement of the latch to its retracted position while permitting pivotal movement of the other spindle hub, and in the other extreme position the abutment member permitting pivotal movement of both spindle hubs,

a second opening in the housing from plate through which the abutment member is exposed so that the abutment member can be swung from one extreme position to the other by finger operation, the second opening being large enough to permit the entire abutment member to pass through it,

a pin mounted in the housing upon which the abutment member is supported for pivotal movement, and

an opening in one of the housing side walls through which the pin can be removed to free the abutment member so that the latter can be removed from the housing through



the second opening in the front plate without opening the housing,

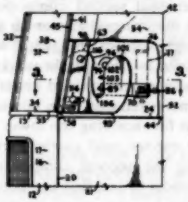
whereby the abutment member can be reversed with respect to said first orientation by rotating the abutment member 180° about a horizontal axis, and reinserted into the housing through the second opening, following which the pin can be reinserted in the housing to again pivotally support the abutment member, the abutment member said reversed orientation being capable of directly interfering with pivotal movement of the other of the two spindle hubs but not with said one of the hubs.

4,695,083

LATCH FOR PICKUP TRUCK COVER DOORS AND THE LIKE

Dennis C. Herrmeyer, Richmond, Kans., assignor to Rigid Form, Inc., Richmond, Kans.

Filed Mar. 10, 1986, Ser. No. 837,737
Int. Cl.[4] E05C 3/10
U.S. Cl. 292—241 **1 Claim**



1. In combination with a pickup cover having: a top; opposed side walls; a rear end with a pair of coplanar side wall rear legs and a pair of flanges extending forwardly from said cover side wall rear legs, said flanges defining a cover door opening therebetween in said cover rear end; a cover door having upper, lower and opposite side edges with upper, lower and opposite side rails located thereat with said upper rail being hingedly connected to said cover rear end and said lower rail having a back surface, the improvement of a latch mechanism, which comprises:

(a) a pair of angle-section door jambs each having:

(1) a proximate leg with inside and outside faces, said proximate leg being mounted on said cover side wall flange with its outside face against said cover side wall flange; and

(2) a distal leg extending from said proximate leg at a right angle and lying in a plane parallel to a plane formed by said shell rear end, said distal leg having front and back faces;

(b) a pair of elastomeric door jamb weatherstrips each including:

(1) a proximate leg mounted on the inside face of a respective door jamb proximate leg; and

(2) a distal leg mounted on the rear face of a respective door jamb distal leg whereby said door jamb and said door jamb weatherstrip distal legs project inwardly into said cover rear opening in opposed relation;

(c) a pair of handle assemblies each mounted on said lower rail in proximity to a respective said rail and including:

(1) a handle assembly plate mounted on said lower rail back surface;

(2) a T-handle;

(3) a shaft selectively rotatably journalled in said mounting plate and said lower rail, said shaft having a rear portion projecting rearwardly from said mounting plate and mounting said handle and a front portion projecting forwardly from said lower rail;

(4) a keyed lock cylinder located in said handle and having an open position permitting said shaft to rotate with respect to said lower rail and a locked position preventing rotation of said shaft with respect to said lower rail;

(5) a lever mounted on said shaft front portion and including: an extension section with proximate and distal end; a spacer section extending from said extension section proximate end; a return section extending from said spacer section, said extension and return sections being substantially parallel and including aligned, square receivers adapted for receiving said shaft in a nonrotatable engagement; and a bight section extending rearwardly from said extension section distal end in substantially parallel, spaced relation from said spacer section, said spacer and bight sections extending at substantially right angles from said extension section proximate and distal ends and said spacer section having a threaded receiver extending therethrough parallel to said extension and return sections;

(6) a set screw threadably received in said spacer section receiver whereby said lever is fixedly mounted on said shaft; and

(d) a hook plate including:

(1) an inner leg having an upper end, a cam lobe located below and outwardly from said upper end and a substantially vertical notch edge located below said cam lobe;

(2) an outer leg integrally connected to said inner leg and having a first fastener receiver and a slotted second fastener receiver;

(3) a pair of fasteners extending through said outer leg fastener receivers and a respective door jamb distal leg whereby said hook plate outer leg is fastened on the front face of said door jamb distal leg in spaced relation from said door lower rail with said door in its closed position; and

(4) a notch defined between said inner and outer legs and having a notch lower end whereat said inner and outer legs are connected and adjacent to said notch edge, said notch being adapted to selectively receive said lever bight section with said latch in its locked position;

(e) said lever bight section being slidable along said inner leg

cam lobe and said notch edge when said handle assembly is turned to its locked position;

(f) said hook plate inner leg notch edge being located substantially level with said shaft when said door is in its closed position and said hook plate inner leg cam lobe being located further from said shaft rotational axis than said inner leg notch edge;

(g) said lever being subjected to a first tensile force with said bight section engaging said cam lobe and a second tensile force with said bight section engaging said notch edge, said first tensile force being greater than said second tensile force; and

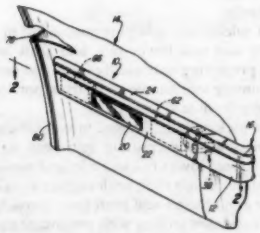
(h) said cover side wall rear leg being prevented from spreading outwardly with respect to said door by said lever tensile forces and said engagement of said lever bight sections with said hook inner leg notch edges.

4,695,084

MOVABLE MOLDING FOR A VEHICLE

Mark C. Hlavach, Sterling Heights, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Dec. 8, 1986, Ser. No. 939,194
Int. Cl.[4] B60R *19/02*
U.S. Cl. 293—126 **4 Claims**



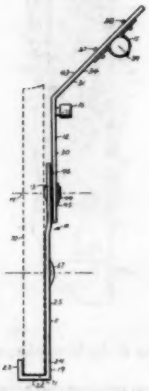
1. A movable molding for a vehicle having a body and a bumper mounted on one of the forward and rearward ends thereof, energy absorbing structure mounting the bumper to the vehicle, said energy absorbing structure biasing the bumper to a normal position but permitting movement of the bumper toward the vehicle upon impact, said bumper having an end portion extending around a side of the vehicle body, said molding comprising a relatively rigid element having an underside and an exterior side, the molding lying on the exterior of the vehicle body in alignment with, and adjacent to, said bumper end portion, fastening means securing the molding to said bumper end portion, slide element means connected to the vehicle body, the molding being, with respect to the length of the vehicle, slidably received on the slide element means, the slide element means maintaining the molding in position relative to the vehicle body while permitting the molding to slide in the direction of the bumper movement, the bumper end portion adapted to move the molding on the slide element means when the bumper is moved towards the vehicle upon impact and move the molding back to its original position upon retraction of the bumper end portion after impact, the molding having an enlarged opening in the end thereof adjacent to the bumper end portion, the bumper end portion having opening means therein, the fastening means comprising a fastening element extending through the enlarged opening in the molding and the opening means provided in the bumper end portion, a base having a pin extending vertically slidably therethrough with ends of the pin extending from the base, the fastening element being secured to said base, the molding having opening means on the underside thereof receiving said pin ends to pivotally and vertically slidably mount the base to facilitate orientation and passage of the fastening means through the opening means in the bumper end portion during assembly and permit vertical movement of the base on the pin to accommodate vertical movement of the bumper end portion upon impact, with the molding remaining vertically stationary.

4,695,085

SHEET CARRIER

Mark A. Cassels, 637 Fernandina St., Palm Bay, Fla. 32907

Filed Nov. 3, 1986, Ser. No. 926,121
Int. Cl.[4] B65G *7/12*
U.S. Cl. 294—15 **3 Claims**



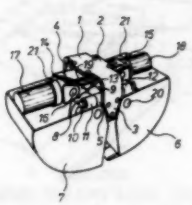
1. A hand held sheet carrier for use with plywood, wallboard and the like sheet material comprising: a first rigid component that has an upright working position, and a foot portion for supporting a sheet to be carried on the carrier, said foot portion having means defining a channel that is upwardly opening and horizontally arranged at said working position for receiving the lower edge of a sheet to be supported thereby, a second rigid component, a handle mounted on said second rigid component for grasping by a user of the carrier, and pivot means interconnecting the first and second components and establishing a pivot axis offset from said foot portion for pivotal movement of said second component with respect to said first component, said second component having a first pivotal position with respect to said first component, and foot means which is horizontally offset from the foot portion of said first component when said second component is at said first pivotal position, said foot means and said foot portion being adapted and arranged when said second component is at said first pivotal position to support said carrier on an underlying support surface through contact therewith, whereby said first component is retained in said upright working position when said carrier is thus supported on said underlying support surface and said channel is retained in an upwardly opening horizontal arrangement for receiving the lower edge of a sheet to be carried on the carrier; said carrier further comprising a device for locking the second component against pivotal movement with respect to said first component, and said locking device comprising screw means mounted on one of said first and second components, and threaded means mounted on the other of said first and second components, said screw means being arranged in working alignment with said threaded means when said second component is at said first pivotal position and thereat being threadedly engageable with said threaded means.

4,695,086

TWO-SIDED GRAB BUCKET WITH PLURAL OPERATING CYLINDERS

Alfred Kinshofer, Wendelsteinstrasse 8, 8160 Miesbach, Fed. Rep. of Germany

Filed Sep. 9, 1985, Ser. No. 773,640
Int. Cl.[4] B66C *3/02*
U.S. Cl. 294—68.23 **5 Claims**



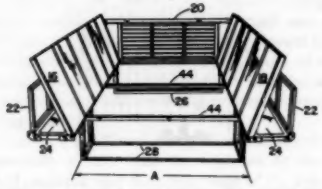
1. A two-sided grab bucket comprising a U-shaped scoop carrier having a pair of opposite depending legs a pair of scoops each of which includes opposite side walls and a crosspiece extending between and affixed to said side walls, said crosspieces being parallel and supported by said carrier legs for rotation about parallel axes, a pair of longitudinally spaced actuating levers affixed to and projecting transversely from each of said crosspieces, a piston-cylinder unit including a pair of cylinders and pistons and a common piston rod extending between and coupled to said pistons, each of said cylinders including an end head piece having a guide slidably engaging said piston rod and a pair of longitudinally spaced coaxial pivot pins mounted on each of said cylinder head pieces on opposite sides of said guide and rockably coupling each pair of said levers to a respective cylinder head piece, said head pieces being provided with yokelike recesses on both sides of the respective guides, opposite walls defining each of said recesses and having transverse coaxial bores engaging respective pins, and the ends of said actuating levers of each pair being affixed to each crosspiece and being pivoted to said pins.

4,695,087

CONVERTIBLE TRUCK BED FOR PICKUP

J. Richard Hollrock, Simsbury, Conn., assignor to Hollrock Engineering, Inc., Granby, Conn.

Filed Dec. 30, 1985, Ser. No. 814,636
Int. Cl.[4] B60J *7/10*
U.S. Cl. 296—14 **8 Claims**



1. A truck bed for a pickup truck body having a floor and sides of height (H) such that the floor area is limited to a generally rectangular shape dicated by a lateral dimension (A) between the truck body's sides and a longitudinal dimension B equal to the length of the floor, said truck bed comprising;

(a) a removable frame having at least one lower leg portion of width (A) said lower leg end portion abutting the floor inside the truck body, said leg portion having an upper end at a height H above the lower end thereof.

(b) said frame having two longidutinally extending members supported on said leg upper end portion and spaced from one another by a dimension at least approximately (A),

(c) said frame having a forward bulkhead supported by forward ends of said longitudinally extending members, said bulkhead including laterally outwardly extending shelf support portions,

(d) said frame having longitudinally extending shelf margin portions spaced outboard of and in the same plane as said longitudinal frame members,

(e) at least two support struts extending between said longitudinal frame members and said shelf margin portions,

(f) platform defining panel means provided on said longitudinally extending members, and shelf panels provided on said shelf support portions, said shelf margin portions and said shelf support struts, said platform panel means including at least two platform panels, each of said panels pivotably mounted to one of said longitudinally extending frame members, and said panels being movable to positions inclined outwardly and upwardly to form upwardly projecting sides of the truck body to increase the capacity of the basic truck body, and

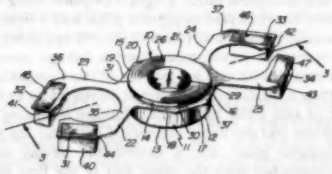
(g) side rails pivotably connected to said shelf margin portions, and means provided in part on said bulkhead for supporting said rails in upright positions perpendicular said plane.

4,695,088

OIL DROP COLLECTOR

Otto S. Jensen, 5650 Panorama Dr., Whittier, Calif. 90601

Filed Aug. 1, 1986, Ser. No. 891,552
Int. Cl.[4] B62D *25/20*
U.S. Cl. 296—38 **4 Claims**



1. An oil drop collector comprising:

an oil collection reservoir defining an oil collection recess;

an absorbent cartridge configured to be received within said oil collection recess;

wherein said absorbent cartridge extends beyond said oil collection recess by a predetermined distance;

a plurality of resilient flexible arms extending outwardly from said reservoir;

wherein said oil collection reservoir and said plurality of resilient flexible arms form a one-piece molded unit;

a plurality of magnets secured to each of said resilient flexible arms in said plurality of resilient flexible arms; and

wherein said resilient flexible arms each terminate in a recessed cavity and wherein said magnets in said plurality of magnets are received within said recessed cavities and adhesively secured therein.

4,695,089

UPPER BODY STRUCTURE OF AN OPEN-TOP VEHICLE

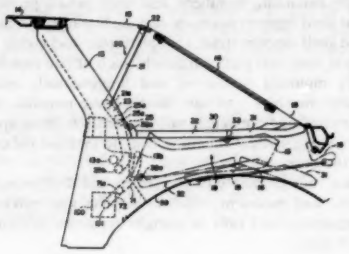
Hisao Fukutomi; Takeshi Konishi; Koji Kuraoka; Morio Umeda; Takanori Tuchiya, and Yutaka Imura, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 18, 1986, Ser. No. 829,925

Claims priority, application Japan, Feb. 18, 1985, 60-21398[U]; Apr. 27, 1985, 60-91431; Apr. 27, 1985, 60-91434

Int. Cl.[4] B60J 7/11, 7/12

U.S. Cl. 296—107 **9 Claims**



1. An open-top vehicle body structure including a body section, foldable hood means adapted to cover at least a part of the body section, link means for supporting said hood means, said link means being movable between an extending position wherein the link means supports the hood means in an extended position and a retracted position wherein the link means allows the hood means to be folded, first operating means provided at one side portion of the body section for moving the link means at one side between the extending position and the retracted position, second operating means provided at the other side portion of the body section for moving the link means at the other side between the extending position and the retracted position, said link means including a swingable pillar of an inverted U-shape having opposite leg portions mounted on the body section for swinging movement about a transversely extending horizontal axis, said hood means being connected at a front edge portion to said swingable pillar and at a rear edge portion to a part of said body section located rearwardly of said swingable pillar, a rigid roof panel being removably mounted between said swingable pillar and a front windshield structure, each of said first and second operating means including reversible motor means and a linkage connecting said motor means with said leg portion of the swingable pillar for converting a rotation of said motor means into a swingable movement of said pillar means, said linkage including a first link having one end pivotably connected with said leg portion of the swingable pillar, and a second link having one end pivotably connected with the other end of the first link, the other end of the second link being connected with an output shaft of said motor means.

4,695,090

EXTERNALLY RETRACTABLE SUNROOF ASSEMBLY

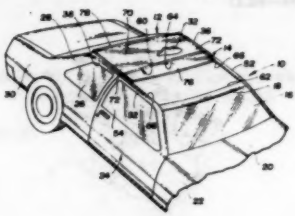
David L. Draper, Whitemore Lake, Mich., assignor to Cars & Concepts, Inc., Brighton, Mich.

Filed May 23, 1986, Ser. No. 866,595

Int. Cl.[4] B60J 7/047

U.S. Cl. 296—216 **7 Claims**

1. In a vehicle body including an outer roof panel having side edges and also having inner rails that cooperate with the side edges of the outer roof panel to provide a pair of hollow side rails, and side doors having upper window frames including outer frame members that continue the contour of the outer roof panel at the side edges thereof with the side doors in a closed position, an externally retractable sunroof assembly comprising: a roof opening in the outer roof panel; said roof opening having forward and rearward edges and having side edges exposing the interior of the side rails of the roof; a pair of tracks respectively mounted within the pair of side rails; and a sunroof having side edge portions extending over the side rails and being respectively mounted by the pair of tracks



therein for movement between a closed position closing the roof opening and an externally retracted position above the outer roof panel to the rear of the roof opening to thereby open the roof opening, and the sunroof having the side edge portions thereof in the closed position respectively juxtaposed with respect to the upper window frames of the side doors to provide a continuous door-to-door appearance.

4,695,091

HEAT CONDUCTOR CONNECTIONS BETWEEN SEATS AND BACKRESTS OF VEHICLES

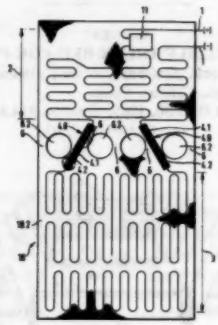
Horst-Dieter Altmann, Gründau-Lieblos, and Eberhard Haupt, Gründau-Rothenbergen, both of Fed. Rep. of Germany, assignors to I.G. Bauerhin GmbH Elektro-Technische Fabrik, Gründau-Rothenbergen, Fed. Rep. of Germany

Filed Nov. 19, 1986, Ser. No. 932,292

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1985, 3544499

Int. Cl.[4] A47C 7/72

U.S. Cl. 297—180 **4 Claims**



1. In heat conductor connections between electrical heating elements located in seat and backrest surfaces having a padded core, said surfaces separated by a bracing trough provided in said padded core, a first bracing wire bonded into said padded core beneath said bracing trough, said first bracing wire exposed in sections by window-like recesses in said bracing trough, covering materials on said surfaces having a second bracing wire, an insert loop connecting said first and second bracing wires, the improvement comprising:

connecting webs between said seat and backrest comprising woven or knitted copper bands and connecting heating conductor sections laid in a meander or wave form bearing on said copper bands and connecting said heating

elements wherein said connecting webs (4.0) each consist of a two-layer copper strip (4.1) and said heating conductor sections (4.2) are freely movable between the two layers.

4,695,092

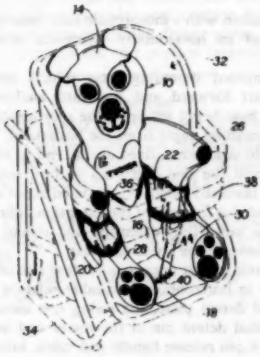
PADDED INFANT SEAT LINER

Debra A. Hittie, R.D. #1, Friedens, Pa. 15541

Filed Oct. 6, 1986, Ser. No. 915,408

Int. Cl.[4] A47C *7/02*

U.S. Cl. 297—230 7 Claims



1. A padded liner, for use in an infant safety automobile seat of the type having a shell-like chair with a high-back portion, attached to a support frame and adapted to be fastened in use position by the automobile lap belt retainably strapped to the frame, comprising:

a plurality of cushions sewn together to form a substantially self-supporting unit, including a vertically-elongated first backing cushion, a comparatively small and generally rectilinear second cushion having a rearward edge sewn to the lower edge of the first cushion, a pair of vertically-extending spaced-apart side cushions each having a rearward edge joined to a vertically-oriented edge of the first backing cushion;

each of the side cushions having a cross-sectional thickness substantially greater than the thickness of the first and second cushions, and the upper edge of the side cushions being on a level above the horizontal midline of the first backing cushion;

the thickness of the padding in each side cushion adjacent its jointure to the second cushion being substantially greater than the padding thickness at its upper end and of such thickness that placing a child, of sufficient size to fully cover the second cushion, in seated position on the second cushion will cause the padding in the lower ends of the side cushions to compressibly upwardly displace; and

the liner being in the form of a fanciful figure wherein the first cushion constitutes a torso and head, and each side cushion constitutes an arm and leg portion of the figure.

4,695,093

WORK CHAIR

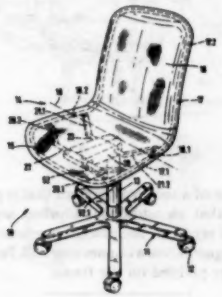
Heinz-Peter Suhr, Grossbottwar, and Bernd Weinberger, Steinheim, both of Fed. Rep. of Germany, assignors to Firma August Froscher G.m.b.H. & Co. K.G., Steinheim, Fed. Rep. of Germany

Filed Jun. 9, 1986, Ser. No. 872,279

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521488

Int. Cl.[4] A47C *3/00, 1/032*

U.S. Cl. 297—300 23 Claims



1. A work chair comprising a base frame adapted to be supported on a floor, a seat divided along a transverse line into a forward seat portion having a rounded forward edge and a rear seat portion, hinge means hingedly joining said forward seat portion and said rear seat portion with one another, with a hinge axis on said transverse line, a backrest structurally joined with said rear seat portion at a substantially unalterable angle, first support means supporting said rear seat portion and backrest on said base frame for movement from a first forward position to a second rearwardly inclined position of said backrest accompanied by a lowering of said rear seat portion, second support means for supporting said forward seat portion on said base frame for movement from a first approximately horizontal position to a second position in which said forward seat portion is inclined downwardly to the rear while said rounded forward edge of said forward seat portion remains at substantially the same height from the floor, and spring means resiliently opposing movement of said backrest and seat portions from said first positions to said second positions.

4,695,094

MOTOR-VEHICLE SEAT WITH BACKREST WHICH CAN BE SWUNG FORWARD OUT OF A POSITION OF USE

Helmut Siebler, Fellbach, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 714,209, Mar. 21, 1985, Pat. No. 4,636,003. This application Aug. 18, 1986, Ser. No. 897,344

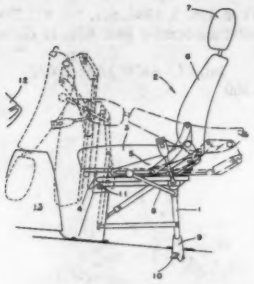
Claims priority, application Fed. Rep. of Germany, Mar. 21, 1984, 3410262

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—331 2 Claims

1. A motor-vehicle seat with a backrest which can be swung forward out of the position of use and which is mounted so as to be pivotable forwardly about a lateral pivot on a bracket connected to a seat-cushion frame, there being a guide device by means of which the point of pivoting of the backrest on the bracket is displaced rearwardly relative to the seat-cushion frame and in the longitudinal direction of the vehicle via a lever arrangement connected to the backrest, characterized in that the guide device is assigned to the bracket in such a way that the latter is arranged so as to be displaceable relative to the seat cushion frame, and in that, when the backrest is pivoted out of the position of use, the backrest together with the

bracket is moved to the rear via at least one supporting lever articulated on the seat frame and fixed to the backrest, and where the bracket in the position of use is locked against an unintended shifting and supports itself in a prestressed condition at a stop face of a toothed segment that is pivotable at the seat frame and that an additional toothed segment engages with the toothed segment, the pivotal movement of said additional toothed segment, via a connecting rod, being transmitted to a locking lever pivoted on the frame.



4,695,095

ARRANGEMENT FOR SECURING THE END POSITION OF A GUIDED SUPPORT ROD OF A HEADREST

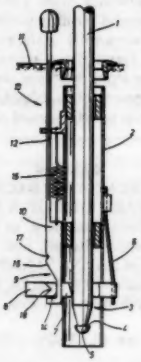
Eberhard Faust, Stuttgart; Kurt Niethammer, Jettingen, and Ludwig Hammer, Nagold, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 4, 1985, Ser. No. 784,108

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436541

Int. Cl.[4] A47C *7/36*

U.S. Cl. 297—410 **7 Claims**



1. An arrangement for securing the position of a support rod means for a vehicle headrest, comprising:

locking means for preventing an unintentional manual removal of said headrest by an operator,

release means for disengaging said locking means to permit manual removal of said headrest, said release means being configured such that an external manual force is unnecessary to maintain said locking means in its disengaged state whereby said headrest may be removed with both hands by the operator using a minimal force, and

a triggering means for automatically resetting the release means to its inoperative position upon reinsertion of said headrest support rod means.

4,695,096

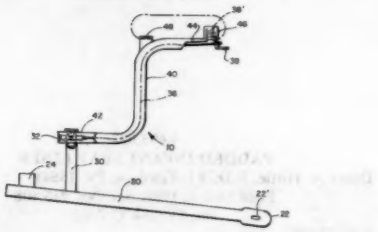
MOTORCYCLE PASSENGER ARM REST

Donald M. Kincaid, R.R. #2, Claremont, Ill. 62421

Filed Nov. 20, 1986, Ser. No. 933,579

Int. Cl.[4] A47C *7/54*

U.S. Cl. 297—417 **2 Claims**



1. In combination with a motorcycle rear passenger seat, the improvement of an horizontally swingable armrest which comprises:

(A) an elongated mounting base which defines plural spaced-apart forward and rearward anchors, the said mounting base being set upon the motorcycle at a rearwardly ascending angle from the horizontal;

(B) an upright connector, fixed at one end to the mounting base adjacent the said rearward anchor, said connector having an inwardly offset extension adjacent a free end of the connector, a free end of the extension defining a detent plate, each said offset extension and detent plate being disposed beneath the passenger seat;

(C) a swing rest mount engaging the free end of the upright connector in horizontally moveable relation to the connector and detent plate, the swing rest mount having a spring-loaded detent pin at the lower end and a spring-loaded lock pin release handle and cable, interconnecting the upper end of the swing rest mount and detent pin, the cable being slideably moveable within the swing rest mount, whereby to provide for alternately setting and releasing the detent pin, relative to the detent plate, the swing rest mount further supporting an armrest cushion adjacent its upper end.

4,695,097

SEAT FOR USE IN MOTOR VEHICLE

Masakazu Muraishi, Isehara, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Sep. 17, 1986, Ser. No. 909,120

Claims priority, application Japan, Sep. 18, 1985, 60-207484

Int. Cl.[4] A47C *7/02*

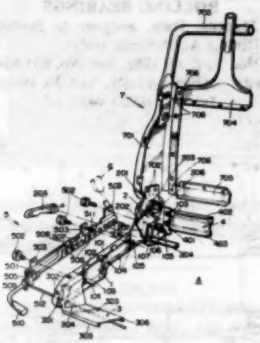
U.S. Cl. 297—452 **11 Claims**

1. A seat mounted on a floor of a motor vehicle, comprising:

a generally rectangular seat cushion frame including two spaced side frames, a front frame having axially opposed ends detachably connected to respective front portions of said side frames, and a rear frame having axially opposed ends detachably connected to respective rear portions of said side frames; and

a seat sliding mechanism including two spaced stationary rails which are detachably secured to said floor in a manner to extend along the respective side frames, and two movable rails which are slidably disposed on the respective stationary rails and detachably connected to the respective side frames; said front frame having a major flat portion which is sloped down toward the rear of said seat cushion frame, said front frame also including side walls

which respectively extend upward from the longitudinallly opposed ends of said major flat portion and are detachably connected to respective upper sides of said



front portions of said side frames, and wherein each side frame of said rectangular seat cushion frame is formed with an inwardly projected flange along the periphery thereof except for the rear portion thereof.

4,695,098

EXCAVATOR, PARTICULARLY FOR CONTINUOUS STRIP MINING OF MINERALS

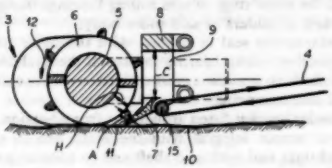
Friedrich W. Paurat, Kasselweg 29, 4230 Wesel 1, and Roland Paurat, Blumenstrasse 11, 4230 Wesel 13, both of Fed. Rep. of Germany

Filed May 16, 1986, Ser. No. 864,439

Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518691

Int. Cl.[4] E21C *35/20, 37/02*

U.S. Cl. 299—64 **10 Claims**



1. In an excavator for mining minerals, particularly for continuous strip mining of said minerals, comprising a track drive, a digging unit with at least one digging roller and a connected conveyor for removing raw ore, said digging roller having a roller core and at least one helical digging and delivery flight, said excavator further comprising a delivery mechanism positioned between said conveyor and said digging roller, the improvement wherein said delivery mechanism comprises a breaking wedge and a delivery frame, said frame lying in a vertical plane and having a delivery opening connected to said breaking wedge, said breaking wedge extending from the underside of said delivery frame to the ground, said wedge having

a breaking surface thereon substantially and continuously tangent to said helical digging and delivery flight when said digging unit is in operation, a gap A existing between said braking wedge and said helical digging and delivery flight of threat height H, and the sum of said gap A and said thread height H being less than the width B and the height C of said delivery opening,

wherein said conveyor is mounted on said underside of said delivery frame, said helical digging and delivery flight is a breaking tool and has a thread pitch G which is smaller than said width B and said height C of said delivery opening and said digging roller is rotatable in the working direction at said breaking wedge from below to above.

4,695,099

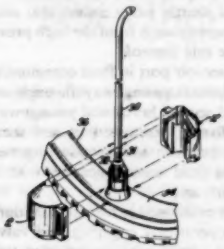
WHEEL SPOKE ADJUSTER GUARD

Mark S. Klein, 76 Dewey Ave., Totowa, N.J. 07512

Filed Apr. 15, 1986, Ser. No. 852,056

Int. Cl.[4] B60B *7/00, 1/00*

U.S. Cl. 301—37 SA **6 Claims**



1. A wheel spoke adjuster guard for wheel spoke adjuster lugs and adjacent wheel spoke, as well as the wheel rim holes through which said wheel spoke adjuster lugs are received, each wheel spoke adjuster guard comprising:

a pair of substantially identical interlocking semi-tubular sections, each said pair of semi-tubular sections being interlockable to form a substantially unitary tubular member proportioned to surround an adjuster lug; and

identical cooperating coupling means on each said semi-tubular section for interlocking the semi-tubular sections in each said pair thereof to form the unitary tubular member, said tubular member, when assembled, providing a hollow central channel extending longitudinally therethrough, said channel being proportioned to encase and closely surround said wheel spoke adjuster lug and at least a portion of its adjacent wheel spoke, and to fixedly engage said portion of said wheel spoke so as to protectively cover said wheel spoke adjuster lug, said adjacent wheel spoke, and said wheel rim opening through which said wheel spoke adjuster lug is received.

4,695,100

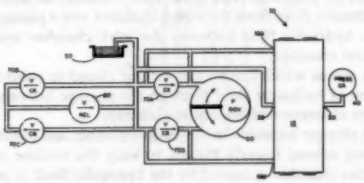
VALVE SYSTEM FOR EXERCISE APPARATUS

James E. Miles, Graham, N.C., assignor to Isotechnologies, Inc., Hillsborough, N.C.

Filed Jan. 17, 1986, Ser. No. 820,717

Int. Cl.[4] B60T *13/18*

U.S. Cl. 303—10 **15 Claims**



1. A hydraulic valve system adapted for quick equalization of high and low pressure in the closed hydraulic circuit of an exercise apparatus when a load is removed, said hydraulic valve system comprising:

a housing defining first and second vertical fluid passageways and first and second intersecting horizontal passageways communicating therewith;

first and second hydraulic circuit connection ports in fluid communication with said first and second vertical fluid passageways, respectively;

a hydraulic pressure gauge port in fluid communication with said first horizontal passageway through an aperture defined by said horizontal passageway;

shuttle valve means operably positioned in said first horizontal passageway between said vertical passageways for opening said normally closed first horizontal passageway aperture in response to high pressure on either side thereof, said shuttle valve means also adapted to allow fluid flow therethrough from the high pressure side to the low pressure side thereof;

a hydraulic reservoir port in fluid communication with said second horizontal passageway through an aperture defined by said second horizontal passageway;

a valve seat fixedly positioned in said second horizontal passageway between said intersecting vertical passageways and in fluid communication with said hydraulic reservoir port; and

a pair of valves positioned in horizontally opposing relationship and cooperatively engaging said valve seat so as to provide fluid communication between the low pressure side of said valve seat and said fourth hydraulic port while simultaneously preventing fluid communication between the high pressure side of said valve seat and said fourth hydraulic port.

4,695,101

PRESSURE REGULATOR

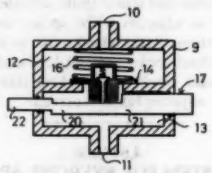
Anthony L. Wondergem, Waikowhai, New Zealand, assignor to Development Finance Corporation, Auckland, New Zealand

Filed Mar. 11, 1986, Ser. No. 838,597

Claims priority, application New Zealand, Mar. 22, 1985, 211548

Int. Cl.[4] B60T *8/36*

U.S. Cl. 303—117 **3 Claims**



1. A pressure regulator for an anti-lock hydraulic braking system, the regulator including:

a housing with an inlet chamber and an outlet chamber;

an inlet for hydraulic fluid to the inlet chamber, an outlet for hydraulic fluid from the outlet chamber and a passage for the hydraulic fluid between the inlet chamber and the outlet chamber;

valve means which can be opened and closed to control the flow of hydraulic fluid through the passage between the inlet chamber and the outlet chamber;

and a plunger locatable in the outlet chamber and capable of being moved linearly therein to vary the volume of the outlet chamber occupied by the hydraulic fluid to modulate the pressure within the outlet chamber when the flow of fluid between the inlet chamber and the outlet chamber is cut off, the plunger being also rotatable in the outlet chamber and incorporating a cam in contact with the valve means, the cam being arranged upon rotation of the plunger to open and close the valve means.

4,695,102

LUBRICATED ROLLER FOR THE TRACKS OF CRAWLER VEHICLES, IN PARTICULAR, A TOP ROLLER WITH FIXED OVERHUNG SHAFT AND ROLLING BEARINGS

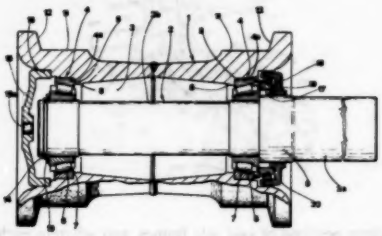
Aldo Crotti, Modena, Italy, assignor to Societa' Italtractor Meccanica Itm S.p.A., Potenza, Italy

Filed Nov. 26, 1985, Ser. No. 801,854

Claims priority, application Italy, Nov. 30, 1984, 29049/84[U]

Int. Cl.[4] B62D *4455/14*

U.S. Cl. 305—11 **14 Claims**



1. A lubricated roller for the tracks of crawler vehicles, in particular a top roller, of the type featuring a fixed overhung shaft and rolling bearings, said roller comprising:

a shaft having an overhung end and an anchored end, a groove located at its overhung end with a first snap ring therein, and external limiting means located at its anchored end;

a roller body carried by the shaft and provided with a bore cavity through which said shaft passes through, said roller body having a pair of shoulders at the ends of said bore cavity;

a pair of rolling bearings located between said shaft and said roller body, the inner ring of a first of said rolling bearings being checked by contact with said external limiting means at said anchored end of said shaft, the inner ring of the other rolling bearing being checked by said snap ring, and the outer rings of said rolling bearings being checked by said shoulders of said roller body;

a frontal-action seal in contact with the outer ring of the respective rolling bearing located at the anchored end of the shaft, to prevent egress of lubricant between said seal and said outer ring;

an annular bracket fitted around the frontal-action seal such as to remain integral with the shaft, and to provide a fluid-tight seal with said shaft and an annular part of said seal; and

an outer circular cover enclosing a lubricant chamber at the overhung end of the shaft by being fixed to the body of the roller, said outer circular cover being located in a cylindrical seat in the outer edge of said bore cavity.

4,695,103

DISKETTE HOLDER

John B. MacDonald, Dedham, Mass., and David E. McLinn, Merrimack, N.H., assignors to Continental Molding Corporation, Auburn, Me.

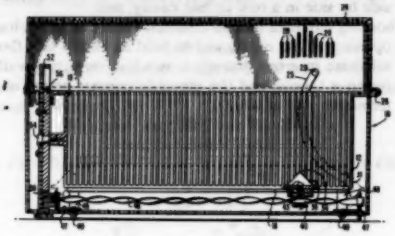
Filed Apr. 28, 1986, Ser. No. 856,285

Int. Cl.[4] A47B *81/06*

U.S. Cl. 312—18 **12 Claims**

1. A container for storing a plurality of substantially flat articles, such as word-processing diskettes, said container comprisisng an article holder having an elongated, generally rectangular interior with a plurality of slots each for receiving an article to be stored with said articles being aligned in sibe-by-side relation and slidable in opposite directions within said slots, indexing means for movement along said elongated interior to sequentially engage an edge portion of each article and

simultaneous with said engaging to sequentially slide each engaged article within said slot to a position out of alignment



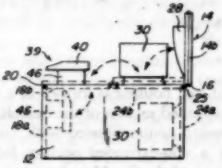
with the remainder of said stored articles, said indexing means being in continuous article engagement during said movement along said elongated interior.

4,695,104

COMPUTER FURNITURE

Elsie J. Lederman, 630 Victory Blvd., Apt. 6-G, Staten Island, N.Y. 10301

Filed Jan. 13, 1986, Ser. No. 818,375
Int. Cl.[3] A47B *81/00*
U.S. Cl. 312—26 **7 Claims**



1. A piece of computer furniture convertible between a rectangular table and a computer desk which comprises:

(a) a pair of side panels spaced horizontally apart;

(b) a foldable top extending entirely across said side panels and hinged to a rear edge of said side panels, said top arranged in one instance in a flat horizontal position for use as an entire table top of the rectangular table and in another instance in a foldable vertical position as a back support for the computer desk;

(c) a front panel extending entirely across each side panels and hinged to said side panels, said front panel arranged in one instance in a vertical position as an entire front of the table and in another instance in a horizontal position as a front part of the computer desk top;

(d) a back panel extending entirely across said side panels and hinged to said side panels, said back panel arranged is one instance in a vertical position as an entire back of the table and in another instance in a horizontal position as a back part of the computer desk top; and

(e) means for locking said front panel and said back panel in said horizontal position to form together as the entire computer desk top.

4,695,105

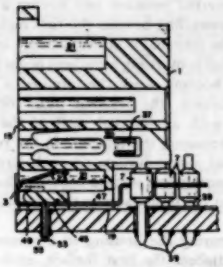
FILTERED ELECTRICAL RECEPTACLE

Reuben E. Ney, Mount Joy; Raymond V. Pass, Camp Hill, and Patrick F. Yeager, Middletown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 683,846, Dec. 20, 1984, abandoned. This application Feb. 10, 1986, Ser. No. 828,566
Int. Cl.[4] H01R *4/66, 13/66*
U.S. Cl. 439—95 **6 Claims**

1. An electrical connector, comprising:

a dielectric housing member having a plurality of passageways extending through said housing member, said passageways extending parallel to a longitudinal axis of said housing member, said housing member having recess means extending inwardly from a front surface of said



housing member for at least part way of said housing member;

electrical contact members secured in said passageways and having contact sections in said passageways and terminal sections extending along a rear surface of said housing member as well as beyond a bottom surface of said housing member for electrical connection to conductive areas of a circuit board;

filter means on said terminal sections and having inside surfaces electrically connected to said terminal sections, most of said filter means being disposed in a recessed section located at a rear bottom portion of said housing member; and

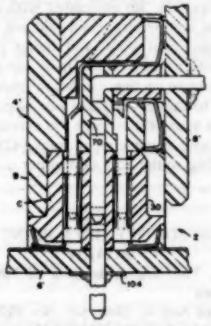
ground plate means having a first and second section of which at least a part extends along an inner surface of said housing member spaced inwardly from said bottom surface, said first section extending rearwardly from said part and being disposed in said recessed section and having apertures in which the filter means are located and electrically connected to the ground plate means, said second section extending forwardly from said part and extending along the front surface of said housing member and including spring fingers disposed in said recess means for electrical connection with a complementary electrical connector.

4,695,106

SURFACE MOUNT, MINIATURE CONNECTOR

Steven Feldman, Seminole, and Robert J. Tennant, Largo, both of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 13, 1985, Ser. No. 733,176
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—83 **6 Claims**



1. A surface mount electrical connector for establishing electrical continuity with solder pads on the surface of a printed circuit board comprising:

a housing having a plurality of cavities extending therein from a first surface;

electrical terminals each dimensioned for receipt in one of

said housing cavities and engagable with the housing when partially inserted therein to retain the terminal in a partially inserted position and having a surface mount solder tail extending beyond the first surface of the housing when the terminal is in the partially inserted position, each terminal comprising a resilient beam member located within the housing when the terminal is in the partially inserted position, the resilient beam being frictionally engagable with an internal wall of the corresponding cavity for retaining the terminal in the partially inserted position, and a stop surface on each terminal engagable with the housing first surface adjacent the corresponding cavity when the terminal is in the partially inserted position; and

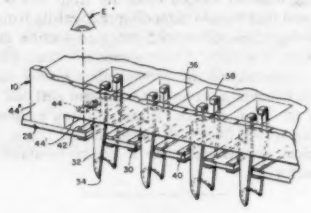
means for securing the housing to a printed circuit board disposed adjacent the first surface, each terminal being independently shiftable further into the cavity and away from the printed circuit board from the partially inserted position as its solder tail is pressed against flat surfaces of said solder pads upon securement of the housing to the printed circuit board, whereby contact is independently established between the solder tails and the solder pads on the printed circuit boards despite deformities in the printed circuit board or warpage of the housing.

4,695,107

INTEGRATED CIRCUIT SOCKETS

James B. Leppert, 903 Frankewitz Rd., Baltimore, Md. 21221

Filed Jun. 9, 1986, Ser. No. 871,848
Int. Cl.[4] H01R *13/05, 9/09*
U.S. Cl. 439—83 **3 Claims**



1. In a system of integrated circuit sockets having: a base with a bottom surface and a plurality of pins in spaced rows in said base for engaging respective holes in a printed circuit board having, adjacent said holes, upper copper tracks, and at least one side wipe **936, 38)** associated with each of said pins, the improvement comprising: each said pin **(32)** being a half circle in cross-sectional view and being conically tapered longitudinally with a sharp chisel tip at one extreme end **(34)**, said half circular cross section extending from said sharp chisel tip substantially to said at least one side wipe at the other end of said pin, and a spur **(40)** on each pin extending to a location for resting on a said upper copper track **(42)** and serving as a path for conveying solder to a said upper copper track **(42)**.

4,695,108

CONNECTOR FOR FLEXIBLE PRINTED CIRCUIT BOARD

Norio Ichitsubo, Yao, Japan, assignor to Hosiden Electronics Co., Ltd., Japan

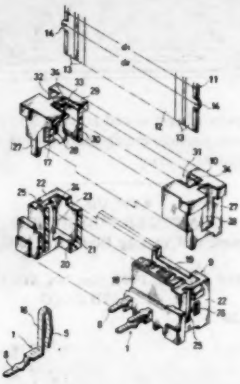
Filed Aug. 4, 1986, Ser. No. 892,988
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—59 **6 Claims**

1. A connector for flexible substrates comprising:

a flexible substrate having an expanded section formed on an end thereof,

a connector body having a cavity opened upward with movable contact points of a number of terminals arranged side by side in a row in said cavity, and

a housing mounted on said connector body so as to close an opening of said cavity and to hold an end of said flexible substrate inserted through a window on a top wall between a tongue and the movable contact points of said terminals, and in which,



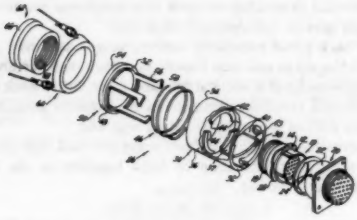
the window of said housing is formed of a wide opening to insert the expanded section of the flexible substrate, and a narrow opening communicated with said wide opening into which a non-expanded section following the expanded section of the flexible substrate is fitted when the connector body is capped so that the non-expanded section is interlocked with the housing under the window when fitted into the narrow opening.

4,695,109

QUICK RELEASE CONNECTOR

Lloyd G. Ratchford, Oneonta, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Aug. 28, 1986, Ser. No. 902,240
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—155 **7 Claims**



1. An electrical connector comprising a plug, a coupling ring surrounding the plug for coupling to a receptacle adapted to releasably mate with the plug, the coupling ring having a bayonet groove spiralling axially rearward from a front face for engaging a bayonet pin extending from the receptacle, and release means for releasing the receptacle from the coupling ring upon the occurrence of an axial force therebetween exceeding a predetermined amount, said release means including

a locking ring having a locking finger,

first bias means for biasing the locking ring axially rearward relative to the plug, and

second bias means for biasing the coupling ring axially for-

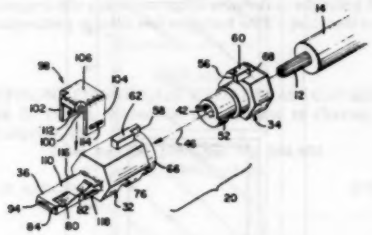
ward relative to the locking ring, said second bias means being disposed between said rings.

4,695,110

ELECTRICAL CONNECTOR APPARATUS

Henry G. Wasserlein, Seminole, Fla., assignor to Amp Incorporated, Harrisburg, Pa.

Filed Oct. 21, 1985, Ser. No. 789,592
Int. Cl.[4] H01R *25/00*
U.S. Cl. 439—289 **24 Claims**



1. For use in an electrical connector assembly, an electrically conductive terminal for attachment to an end of a length of cable comprising:

a stator member and a rotor member rotatable with respect to each other about an axis of rotation, said stator member and said rotor member each having a bore offset from the axis of rotation for receiving a cable end when said bores are in alignment along a common axis and for terminating the received cable end when said bores are out of axial alignment as a result of relative rotation between said stator member and said rotor member.

a bayonet formed on the front end of one of said members and adapted to be positioned in contact with an associated electrial element; and

resilient means attached to said bayonet for releasably latching said bayonet in contact with the associated electrical element.

4,695,111

ZERO INSERTION FORCE CONNECTOR HAVING WIPING ACTION

Dimitry Grabbe, Middletown; Iosif Korsunsky, Harrisburg; Thomas M. Klunk, Dover, and Joseph S. DiOrazio, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 10, 1986, Ser. No. 849,980
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—266 **16 Claims**

1. An electrical connector comprising:

an insulating housing having a substrate-receiving surface and a mounting surface;

an opening extending into the substrate-receiving surface for reception of a substrate having spaced-apart terminal pads;

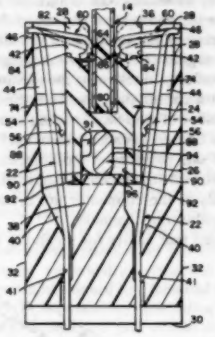
terminals positioned in the housing adjacent the opening having free ends which are proximate the substrate-receiving surface and fixed ends which are proximate the mounting surface, the terminals having thereon contact engagement cam followers and contact wipe cam followers;

contact arms extending from the free ends toward the opening, the contact arms having outer ends, each outer end comprising a contact portion of the terminal and the contact wipe cam follower;

camming block means positioned in the opening which is movable between a first position and a second position;

an actuator provided in the housing for moving the camming block means between the first position and the second position;

contact engagement cam surface means integral with the camming block means being associated with, and adjacent to, the contact engagement cam followers, the contact engagement cam surface means and the contact engagement cam followers being effective, during movement of the camming block means from the second position to the first position, to flex the terminals away from the opening so that the contact portions of the terminals are moved away from the opening allowing the substrate to be placed in the opening under zero insertion force conditions, and upon movement of the camming block means back to the second position, the terminals are moved toward the



substrate allowing the contact portions to move against the terminal pads, the contact portions are held resiliently urged against the terminal pads under normal force conditions; and

contact wipe cam surface means integral with the camming block means being associated with, and proximate to, the contact wipe cam followers, the contact wipe cam surface means being engageable with the contact wipe cam followers during a final portion of the movement of the camming block means to the second position and being effective to move the contact portions over the terminal pads under normal force conditions producing clean contact surfaces at the electrical interfaces of the contact portions and the terminal pads.

4,695,112

PRINTED CIRCUIT BOARD, EDGEBOARD CONNECTOR THEREFOR

Donald M. Maston, Livonia, and Kenneth H. Mertz, Mount Clemens, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Dec. 29, 1986, Ser. No. 947,303
Int. Cl.[4] H01R *13/639*
U.S. Cl. 439—350 **4 Claims**

1. An edgeboard connector for connecting a plurality of wires to an edge-card plug of a printed circuit board;

wherein a plurality of terminals each of which having an oval-shaped front end which imposes spring-like pressure against conductor runs terminating within the edge-card plug are positioned in a plurality of channels disposed along a bottom surface of the connector;

wherein each of the plurality of terminals has a lance depending from a base of the terminals which snaps into a slot in each of the plurality of channels for locking each terminal in each channel to prevent accidental retraction of the terminal during use;

wherein each terminal includes a pair of crimping arms at a rear end of each terminal for crimping a wire to the terminal;

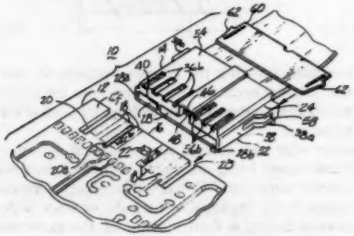
wherein the edge-card plug of the printed circuit board has at least one slot used for mating the circuit board in proper mechanical alignment and electrical polarity with the edgeboard connector; and

wherein the edge-card plug also has a lock hole near one of the three alignment slots that is near the central region of the plug for receiving a lobe on the end of a locking arm formed in one of the plurality of channels along the bottom surface of the connector, the lock arm rising from the bottom of the channel towards a top surface of the connector, the lobe and the lock hole being used for locking the plug to the connector, said connector comprising:

(a) a divided front cavity for receiving the edge-card plug of the printed circuit board, said front cavity having a vertical partition extending the length of said front cavity between the top and bottom surface of the connector, said partition being in alignment with the alignment slot near the central region of the edge-card plug;

(b) a plurality of stop blocks near the rear of said front cavity that project a chosen distance from the top surface, each of said plurality of stop blocks being equally spaced apart but offset a chosen distance above each channel so that only one of said plurality of stop blocks is above each of the channels, said stop blocks being used for ensuring that the terminals of the connector are oriented and inserted correctly within the channels;

(c) an undivided rear cavity for receiving the terminals and



the attached wires which are mated with the conductor runs terminating at the plug of the circuit board, said rear cavity having sidewalls which are the extensions of sidewalls of said front cavity, each of said rear sidewalls having an aperture in a region above the height of sidewalls of the plurality of channels disposed along the bottom surface of the connector;

(d) a right and a left sidewall of each of the terminals disposed between the oval-shaped front end and the crimping arms, said right sidewall having a height that permits a top surface of said right sidewall to slide against and in alignment with a bottom surface of said stop block in each of the channels for assuring that each terminal is oriented and inserted correctly within the channel, said left sidewall of each terminal having a rear locking ear which rises from a top surface of said left sidewall towards the top surface of the connector when the terminal is inserted into a channel in correct orientation;

(e) a lock bar including a pair of collapsible nibs, one of each of said pair of nibs being disposed at opposite ends of said lock bar, said lock bar having a front edge for contacting said ears of said left sidewall of each of the terminals inserted into the channels of the connector, said collapsible nibs of said lock bar being inserted into said apertures of said rear walls of said rear cavity for providing an additional lock for keeping the plurality of terminals in place when the connector is connected to the edge-card plug of the printed circuit board.

4,695,113

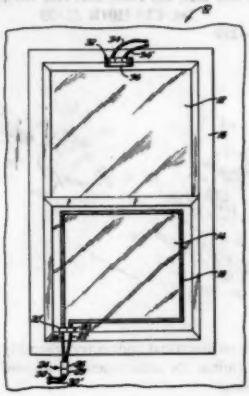
ELECTRICAL WIRE CONNECTORS FOR WIRE OF VARIED SIZES

Ira Eckhaus, 810 E. 3rd St., Brooklyn, N.Y. 11218

Continuation-in-part of Ser. No. 656,860, Oct. 2, 1984, abandoned. This application May 16, 1986, Ser. No. 864,435

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—404 **7 Claims**



1. An electrical terminal block, comprising a base portion having a lower receiving wall for receiving a layer of metal foil material thereon, a metal retaining member havng one wall section engaging the foil material and another wall section, at least one elongated notch formed into said another wall section from a free end thereof defining an opposing pair of cutting edges, and a substantially rectangular member having at least one wire receiving bore formed therethrough and aligned with said elongated notch, whereupon the insertion of the insulated electrical wire into said receiving bore and with the sliding of said metal retaining member onto said base portion, said wire and said elongated notch are forced into engagement to slice the insulation and contact the wire core to electrically interconnect the wire core to the foil material.

4,695,114

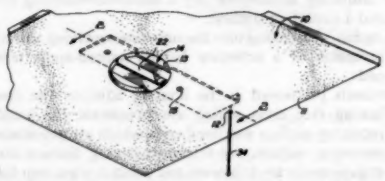
LIGHTING FIXTURE

James R. Stanton, 1117 Wald Rd., Orlando, Fla. 32806, and James R. Legg, 7314 Paprika La., Columbus, Ga. 31909

Filed Apr. 9, 1986, Ser. No. 849,803

Int. Cl.[4] H01R *13/60*

U.S. Cl. 439—573 **6 Claims**



1. A lighting fixture hanging system comprising in combination:

a flat rectangular panel having a pair of apertures therein and shaped to fit in a suspended grid;

an elongated generally flat lighting fixture suspending bracket having pair of end portions and a circular dropped portion shaped to fit over and align with one aperture in said flat rectangular panel and having a plurality of

threaded openings therein positioned to receive threaded fasteners from a lighting fixture, and said lighting fixture suspending bracket circular portion having an elongated opening therein;

an electrical receptacle support tab being fixedly attached to the lighting fixture suspending bracket and fixedly holding an electrical receptacle therein adjacent to the lighting fixture suspending bracket elongated opening; and

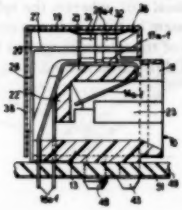
said elongated lighting fixtures suspending bracket also having a switch attached to one end portion thereof and having a pull-cord extending from the switch through an aperture in the panel whereby a lighting fixture can be plugged into a receptacle and attached to a lighting fixture suspending bracket and switched with a pull-cord switch.

4,695,115

TELEPHONE CONNECTOR WITH BYPASS CAPACITOR

Donald R. Talend, Wauconda, Ill., assignor to Corcom, Inc., Libertyville, Ill.

Filed Aug. 29, 1986, Ser. No. 901,824
Int. Cl.[4] H01R *13/66*
U.S. Cl. 439—76 **9 Claims**



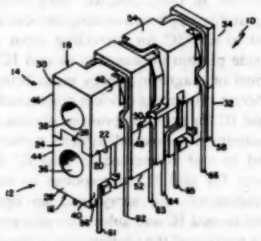
1. A modular telephone jack comprising an insulating body member formed with an opening for a mating connector, a plurality of electrical contacts mounted in said body member, a plurality of surface mounted tombstone capacitors with first ends in contact, respectively, with said plurality of electrical contacts, an electrically conducting planar member mounted to said body member and formed with a plurality of flexible fingers, respectively, engaged by the second end of said plurality of tombstone capacitors, and means for grounding said electrically conducting planar member.

4,695,116

STACKED ELECTRICAL JACKS

James R. Bailey, Chicago, and Emma Basov, Des Plaines, both of Ill., assignors to Switchcraft, Inc., Chicago, Ill.

Continuation of Ser. No. 584,261, Feb. 27, 1984, abandoned. This application May 21, 1986, Ser. No. 870,284
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—188 **16 Claims**



1. An electrical jack assembly comprising:

a first electrical jack including an external surface having therein first recess means disposed for receiving electrical conductors and including a pair of first electrical conductors having contact means comprised of respective switch component end portions of the first electrical conductors disposed in electrically contactable relationship with one another in said first recess means for forming therein a first electrical switch, at least one of said switch component end portions of the first electrical conductors being engageable by a jack plug extended in a first direction relative to said first electrical switch, said switch component end portions of the first electrical conductors being electrically connected to respective terminal end portions thereof extending from a base portion of the first electrical jack in a second direction substantially orthogonal to said first direction; and

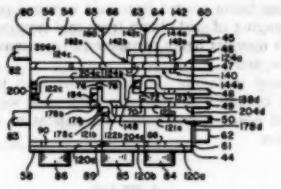
a second electrical jack including an external surface having therein second recess means disposed for receiving electrical conductors and including a pair of second electrical conductors having contact means comprised of respective switch component end portions of said second electrical conductors disposed in electrically contactable relationship with one another in said second recess means for forming therein a second electrical switch, at least one said switch component end portions of the second electrical conductors being engageable by a jack plug extended in a direction substantially parallel with said first direction, a proximal portion of the second electrical jack overlying a distal portion of the first electrical jack, said switch component end portions of the second electrical conductors being electrically connected to respective terminal end portions thereof said terminal end portions of the second electrical conductors extending from said base portion of the first electrical jack in said second direction substantially orthogonal to said first direction.

4,695,117

JACK MODULE AND JACKFIELD

William J. Kysiak, Brookfield, Ill., assignor to Switchcraft, Inc., Chicago, Ill.

Continuation of Ser. No. 740,442, Jun. 3, 1985, abandoned. This application Dec. 31, 1986, Ser. No. 946,672
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—188 **8 Claims**



1. An electrical jack assembly comprising:

a first electrical switch having a pair of contacts, one thereof being engageable by a jack plug and electrically connected to a terminal end portion of the first electrical switch extending beyond a bottom portion of the first switch;

a second electrical switch having a bottom portion disposed over the first electrical switch and having a pair of contacts, one thereof being engageable by a jack plug and electrically connected to a terminal end portion of the second electrical switch extending beyond the bottom portion of the first electrical switch; and

electrical shunt means integrally joined to the respective other ones of the pairs of contacts of the first and second electrical switches for electrically connecting said other ones of the pairs of contacts to one another directly in said assembly.

4,695,118

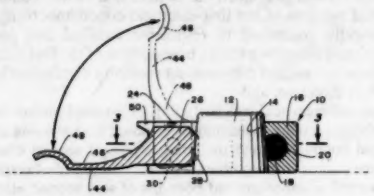
BATTERY TERMINAL POST CLAMP

Garnik Magdesyan; Stepan Magdesyan, both of 436 Wilber Pl., Apt. D, Montebello, Calif. 90640, and Leon P. Boodanian, 526 Griswold St., Glendale, Calif. 91205

Filed Jul. 2, 1985, Ser. No. 751,024

Int. Cl.[4] H01R *11/26*

U.S. Cl. 439—726 **5 Claims**



1. In combination with an electrically conductive battery terminal post, a clamp to be mounted on said post, an electrical conductor separate from said terminal post for conducting of electricity relative to said terminal post, said clamp comprising:

a housing having an enlarged internal opening, said post to be located within said internal opening in a snug fitting manner;

an open-ended slot formed within said housing said slot connecting with said enlarged internal opening;

a hole formed within said housing, said hole having a longitudinal center axis, said longitudinal center axis being tangentially disposed relative to said enlarged internal opening with said hole connecting with said enlarged internal opening, a portion of said electrical conductor to be located within said hole and physically contact said terminal post;

a cam member mounted within said slot connected by connecting means to said housing, said cam member being pivotable between a locked position and an unlocked position, when in said locked position said cam member being in tight contact with said terminal post causing deflection of a portion of said electrical conductor by said terminal post, when in said unlocked position said cam member being spaced from said terminal post permitting disengaging of said clamp from said terminal post;

said cam member being connected to a manually actuatable handle; and

said clamp including locking means, said locking means being operable to maintain said cam member in said locked position preventing movement to said unlocked position.

4,695,119

INFRARED OPTICAL SYSTEM

Iain A. Neil, Bearsden, Scotland, assignor to Barr & Stroud Limited, Glasgow, Scotland

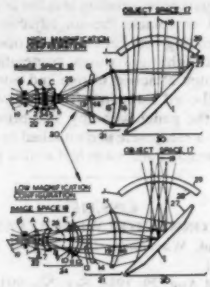
Filed Jan. 13, 1983, Ser. No. 460,549

Claims priority, application United Kingdom, Jan. 14, 1982, 8201045

Int. Cl.[4] G02B *15/14;* **F21V** *9/06;* **B29D** *13/18*

U.S. Cl. 350—1.2 **5 Claims**

1. A forward looking infrared optical system comprising a refractor telescope having a fixed focus achromatic telephoto objective system composed of a primary objective lens element and a secondary objective lens element aligned on a common optical axis, at least one refractive surface of the primary objective element being aspheric and each of the other refractive surfaces of the objective system being substantially spherical, the secondary objective lens element being negatively powered and having a refractive index lower than that of the primary objective element which is positively powered, the degree of asphericity of said aspheric surface or surfaces being such that the telescope is neither afocal nor diffraction limited, in combination with an optically powered window the two refractive surfaces of which are substantially spherical and



concentric and have their common centre of curvature located on said common optical axis, wherein the spherical aberration introduced to the system by the window is compensated by the spherical aberration of the telescope so that the system is substantially afocal and diffraction limited.

4,695,120

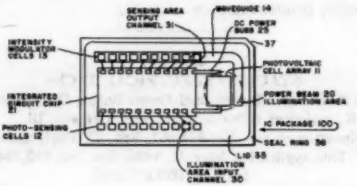
OPTIC-COUPLED INTEGRATED CIRCUITS

James D. Holder, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 26, 1985, Ser. No. 780,139

Int. Cl.[4] G02B *6/12*

U.S. Cl. 350—96.11 **1 Claim**



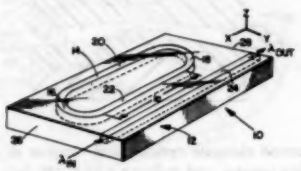
1. A system for an optic-ccupled integrated circuit (IC) comprising a plurality of photon sensing devices mounted onto and connected to said IC for providing input signals in response to outside photon information to said IC without any outside electrical or magnetic energy input being involved, a plurality of photon producing devices connected to and being mounted to said IC for providing output photon data information only as outputs of the overall system, a photo-voltaic cell array mounted to and connected to said IC for providing electrical power for said IC in response to outside photon power illumination of said array; and an optical-coupling means mounted to said IC and subject to said power illumination whereby a portion of the illumination is transferred to said photon producing devices so as to provide a base illumination that said photon producing devices will modulate in accordance to outputs transmitted by the IC.

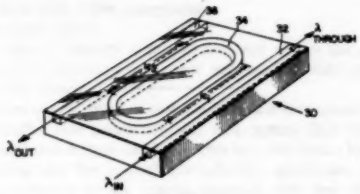
4,695,121

INTEGRATED OPTIC RESONANT STRUCTRES AND FABRICATION METHOD

Amaresh Mahapatra, Lexington; Donald H. McMahon, Carlisle; William C. Robinson, Concord, and Norman A. Sanford, Stillriver, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 28, 1985, Ser. No. 695,467
Int. Cl.[4] G02B 6/12
U.S. Cl. 350—96.12 **20 Claims**





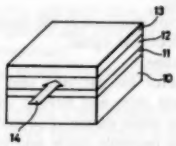
1. An optical resonator for use in controlling optical radiation, said resonator comprising a substrate made of a ferroelectric, Z-cut, crystalline material and having formed therein by the selective exchange of protons for at least one constituent of said substrate material a first optically continuous waveguiding region having predetermined resonant characteristics, said substrate further having formed therein a second waveguiding region having at least one port by which radiation can be coupled in and out of said substrate and at least one section optically coupled to said first optically continuous waveguiding region.

4,695,122

OPTICAL THIN FILM WAVEGUIDE

Koji Ishida, Musashino, and Hiroyoshi Matumura, Iruma, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 30, 1985, Ser. No. 696,478
Claims priority, application Japan, Feb. 1, 1984, 59-15179
Int. Cl.[4] G02B 6/12
U.S. Cl. 350—96.12 **14 Claims**



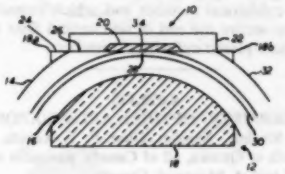
8. A thin film type optical waveguide formed on a substrate, characterized in that at least a part of a core or a clad thereof consists of a sputtered amorphous silicon film which contains such a quantity of at least one other element selected from the group consisting of hydrogen, nitrogen and oxygen that is in the range of quantities not large enough to cause the whole of the silicon to turn into a silicon compound, wherein said amorphous silicon has a refractive index between 2.3 and 3.78.

4,695,123

CUTOFF POLARIZER AND METHOD

Chin-Lung Chang, Phoenix, Ariz., and John R. Feth, Chatsworth, Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Aug. 20, 1985, Ser. No. 767,553
Int. Cl.[4] G02B 5/30
U.S. Cl. 350—96.15 **37 Claims**



1. A polarizer for propagating an optical signal of a selected polarization in a single mode optical fiber having a central core and a cladding surrounding the central core and for radiating optical signals of other polarizations from the optical fiber, comprising:

an interaction region formed in said optical fiber;

cutoff means for preventing propagation of optical waves of all polarizations in said optical fiber through said interaction region;

waveguiding means adjacent said interaction region for guiding optical waves past the interaction region;

means for coupling a wave having a particular polarization from said core to said waveguiding means at a first portion of said optical fiber; and

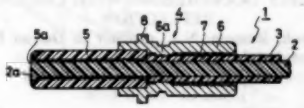
means for coupling the wave having the particular polarization back into said core at a second portion of said optical fiber.

4,695,124

PLASTIC OPTICAL FIBER CABLE WITH FERRULE

Yusaku Himono; Yoshiaki Moriya; Masato Miyahara, and Kazuhiro Suzuki, all of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1985, Ser. No. 696,508
Claims priority, application Japan, Jan. 30, 1984, 59-11546[U]; Mar. 9, 1984, 59-33725[U]; Nov. 1, 1984, 59-166048[U]; Dec. 25, 1984, 59-278490
Int. Cl.[4] G02B 6/36
U.S. Cl. 350—96.20 **16 Claims**



1. A terminated plastic optical fiber cable, comprising:

an optical fiber cable comprised of a plastic optical fiber core surrounded by a protective sheath, wherein at one terminal end of the optical fiber cable the protective sheath is removed to expose a predetermined length of the optical fiber core; and

a composite ferrule coaxially surrounding the terminal end of the optical fiber cable, said ferrule comprising (i) a hollow plastic cylindrical member having an axial bore, said plastic cylindrical member axially surrounding and having a length substantially equal to said predetermined

length of exposed optical fiber core, said plastic cylindrical member having at its end corresponding to the terminal end of the optical fiber cable a recess formed by an enlarged portion of said axial bore, and (ii) a hollow metallic cylindrical member having an axial bore and being joined axially to said plastic cylindrical member and axially surrounding a length of the optical fiber cable, said metallic cylindrical member including a projection in its axial bore which penetrates the protective sheath on said optical fiber cable to axially secure said optical fiber cable in said metallic cylindrical member,

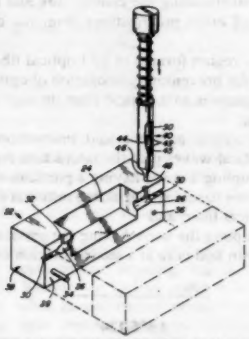
wherein the terminal end of said optical fiber core comprises an enlarged end portion which is flush with the end of said plastic cylindrical member and which extends into said recess to secure the end of said optical fiber core to the end of said plastic cylindrical member.

4,695,125

HERMETIC OPTICAL ATTENUATOR

William J. Sinclair, Kanata; Tibor F. I. Kovats, and Jozef Straus, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Feb. 11, 1981, Ser. No. 233,500
Int. Cl.[4] G02B *6/36, 7/26*
U.S. Cl. 350—96.20 **7 Claims**



1. A hermetically packaged passive fiber optic device, the device having at least one optical fiber connected thereto, the device and an outer surface of a bared portion of said at least one fiber having molded therearound a single block of a bismuth-containing fusible alloy characterized by an expansion during solidification of at least 0.2%.

4,695,126

METHOD AND APPARATUS FOR EFFECTING LIGHT ENERGY TRANSMISSION WITH LESSENED REFLECTION

John S. Cook, Rumson, N.J., assignor to Dorran Photonics, Incorporated, Atlantic Highlands, N.J.

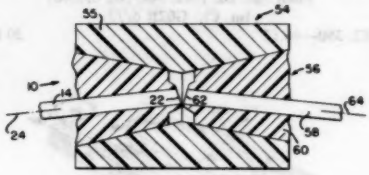
Filed Feb. 11, 1985, Ser. No. 700,458
Int. Cl.[4] G02B *6/38*
U.S. Cl. 350—96.21 **19 Claims**

9. In an optical fiber connector, in combination:

(a) a first housing defining a passage therethrough for residence of an optical fiber therein and having a central axis constituting an energy output axis, at least a portion of said passage adjacent said energy output axis extending along an axis in acute first angle intersecting relation to said energy output axis;

(b) a first elongate optical fiber resident in said first housing passage and accordingly having disposition at said acute first angle to said energy output axis in said passage portion, said fiber defining an end face juxtaposed with said energy output axis, said fiber end face being at an acute second angle to the fiber longitudinal axis and being acutely inclined with respect to said energy output axis;

(c) a second housing defining a passage therethrough for residence of an optical fiber therein, said second housing having a central axis axially aligned with said first housing energy output axis; and



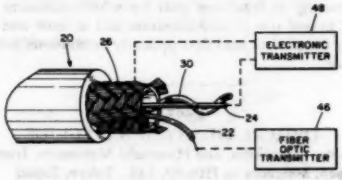
(d) a second elongate optical fiber resident in said second housing passage and defining a fiber end face juxtaposed with a said first housing energy output axis and in energy exchanging relation with said first fiber end face.

4,695,127

HYBRID COAXIAL-OPTICAL CABLE AND METHOD OF USE

Ronald L. Ohlhaber, and Thaddeus R. Uljasz, both of Geneva, Ill., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 27, 1985, Ser. No. 716,579
Int. Cl.[4] G02B *6/44*
U.S. Cl. 350—96.23 **15 Claims**



1. A hybrid cable of substantially uniform cross section throughout its length for concurrently carrying an electrical signal which does not carry confidential information and an optical signal which does not carry confidential information, said cable comprising:

a metallic conductor disposed at the center of the cable for carrying said electrical signal,

a resilient buffer tube,

an optical conductor for carrying said optical signal disposed inside said tube and having an outside diameter smaller than the inside diameter of said tube, said optical conductor being movable inside said tube,

a metallic shield surrounding said metallic conductor and said tube,

centering means for maintaining said metallic conductor and said shield coaxial, and

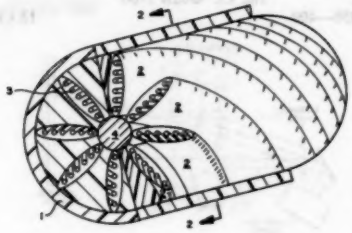
an electrically insulative resilient outer jacket whereby said cable gives the appearance of and taps as a conventional coaxial cable, but additionally can transmit an optical signal.

4,695,128

FIBER OPTIC CABLE

Bernd Zimmerman, and John Chamberlain, both of Hickory, N.C., assignors to Siecor Corporation, Hickory, N.C.

Filed Mar. 25, 1986, Ser. No. 843,984
Int. Cl.[4] G02B 6/44
U.S. Cl. 350—96.23 6 Claims



1. A fiber optic cable comprising:
(a) an outer jacket;
(b) a central member coaxially disposed within the outer jacket, delimiting a first space between the outer jacket and the central member;
(c) a first optical fiber disposed within said first space; and
(d) a buffer tube containing said first optical fiber wound around said central member within said first space, loosely holding said first optical fiber wherein, within any plane perpendicular to the central member, said first optical fiber is free to move within said buffer tube along the line segment containing said first optical fiber radially extending from said central member to said outer jacket, but said first optical fiber is restrained from moving more than slightly elsewhere within said plane.

4,695,129

VIEWER HAVING HEAD MOUNTED DISPLAY UNIT FOR CINERAMA PICTURES

Louis M. H. Faessen, and Giok D. Khoe, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed May 17, 1984, Ser. No. 611,061
Claims priority, application Netherlands, May 26, 1983, 8301864
Int. Cl.[4] G02B 6/06
U.S. Cl. 350—96.25 9 Claims

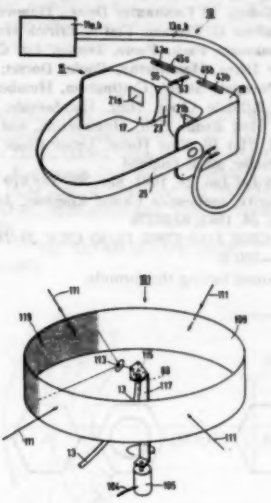
1. Viewer for displaying cinerama television pictures and the like to an individual person comprises

optical fiber bundle means for the transmission of pictures, said bundle having entrance face means onto which the pictures are projected and exit face means to which the pictures are transmitted;

picture generating means for projecting cinerama pictures onto the entrance face means;

a display unit comprising a box shaped holder in which said exit face means of the bundle means is secured, said holder having two viewing apertures formed therein and optical means arranged between said apertures and said exit face means for viewing transmitted pictures, said display unit further comprising a fiberoptic gyroscope for detecting the angular position of said person's head, said gyroscope being coupled to output a control signal which is a measure of the angular rotation of the display unit;

control means for selecting a sub-picture of a cinerama picture generated by said picture generating means in response to receipt of said control signal representing the angular rotation of the display unit;



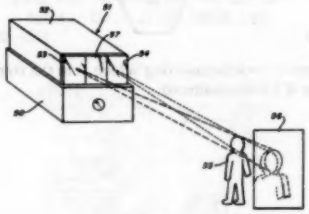
fixing means attached to the display unit for keeping the unit in position on the head of said person.

4,695,130

CAMERA FLASH ATTACHMENT FOR THREE DIMENSIONAL IMAGING SYSTEMS

Antonio Medina, One Emerson Pl., Apt. 17J, Boston, Mass. 02114, and Yehoshua Y. Zeevi, Pierre Hall, Harvard University, Cambridge, Mass. 02138

Continuation-in-part of Ser. No. 537,514, Sep. 30, 1983. This application Aug. 5, 1985, Ser. No. 762,414
Int. Cl.[4] G02B 27/22; G03B 15/02, 15/08, 11/00
U.S. Cl. 350—132 6 Claims



1. A camera flash attachment comprising a light source a pair of filters for transmitting visible light in separate wavebands and means securing said filters in adjacent relation, to each other and over said camera flash attachment to simultaneously filter light from said camera flash attachment whereby light from said flash attachment passing through said pair of filters will create two sets of shadows having distinctive characteristics defined by said separate wavebands.

4,695,131
DISUBSTITUTED ETHANES AND THEIR USE IN LIQUID CRYSTAL MATERIALS AND DEVICES

Peter H. Balkwill, 45 Cressingham Road, Reading, Berkshire; David I. Bishop, 19 Freshwater Drive,, Hamworthy, Poole, Dorset; Andrew D. Pearson, Flat 5, Ettrick House, Ettrick Road, Branksome Park, Poole, Dorset; Ian C. Sage, 238 Freshwater Drive, Hamworthy, Poole, Dorset; George W. Gray, 33 Newgate Street, Cottingham, Humberside; David Lacey, 19 Killdale Close, Hull, Humberside; Kenneth J. Toyne, 25 Hall Road, Hull, Humberside, and Damien G. McDonnell, Flat 10, Eton Hurst, Upper Chase Road, Malvern, Worcester, all of England

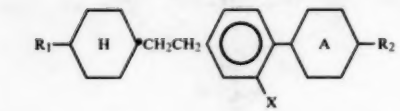
Filed Jan. 25, 1984, Ser. No. 573,819

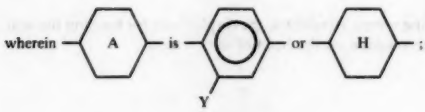
Claims priority, application United Kingdom, Jan. 26, 1983, 8302119; Oct. 24, 1983, 8328370

Int. Cl.[4] G02F *1/13*; C09K *19/30*; C07C *25/18, 43/19*

U.S. Cl. 350—350 R **13 Claims**

1. A compound having the formula:



wherein  ;

R_1 is hydrogen or non-chiral alkyl having up to 12 carbon atoms;

R_2 is hyrogen or non-chiral alkyl or non-chiral alkoxy having up to 12 carbon atoms;

each of X and Y independently represent H or F provided that at least one of X and Y is present and is F;

represents a cyclohexane ring which is in the trans configuration if 1,4-disubstituted;

represents a phenylene ring; and the total number of carbon plus oxygen atoms in R_1 and R_2 is less than 10.

9. A liquid crystal composition comprising a mixture of compounds, at least one being a compound of Formula I, as claimed in claim 1.

4,695,132
FθSINGLE LENS

Nobuo Sakuma, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

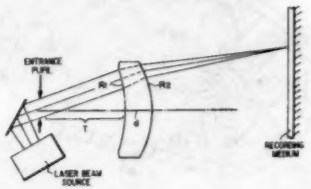
Filed Jul. 1, 1982, Ser. No. 394,148

Claims priority, application Japan, Jul. 2, 1981, 56-103665

The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

Int. Cl.[4] G02B *3/00*

U.S. Cl. 350—409 **13 Claims**



1. An fθ single lens having an optical axis used with a laser beam source providing a laser beam through an entrance pupil on an object side of the lens on said optical axis for focusing the laser beam, comprising a meniscus lens having a positive power with a concave first surface directed toward the object side and satisfying the following:

(i) $1.6 \leqq n \leqq 2.0$

(ii) $-5 \leqq R1/f \leqq -1.7$

(iii) $-0.21 \leqq T/nf \leqq -0.16$

wherein R1 represents the radius of curvature of the first surface, f the focal length, n the refractive index, and T the distance between the first surface of the lens and the entrance pupil to said lens along the optical axis.

4,695,133
HIGH RANGE ZOOM LENS

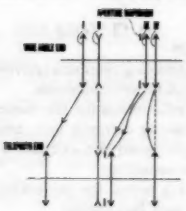
Nozomu Kitagishi; Sadatoshi Takahashi, both of Tokyo; Keiji Ikemori, Kanagawa; Kikuo Momiyama, Kanagawa, and Tsunefumi Tanaka, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 29, 1985, Ser. No. 717,376

Claims priority, application Japan, Apr. 2, 1984, 59-65489

Int. Cl.[4] G02B *15/16*

U.S. Cl. 350—427 **11 Claims**



1. A zoom lens comprising:

from front to rear, a first lens unit of positive power, a second lens unit of negative power, a third lens unit of positive power and a fourth lens unit,

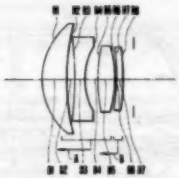
when zooming, said second lens unit remaining stationary, said first lens unit and said third lens unit moving along an optical axis independently of each other, and said fourth lens unit moving in such a manner that the direction of advance changes on the way.

4,695,134

COMPACT PHOTOGRAPHIC LENS

Hiroki Nakayama; Yasuhisa Sato, both of Kanagawa, and Yasuyuki Yamada, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1984, Ser. No. 678,222
Claims priority, application Japan, Dec. 6, 1983, 58-230268
Int. Cl.[4] G02B *13/18, 9/34*
U.S. Cl. 350—432 10 Claims



1. A photographic lens comprising, from front to rear, a positive meniscus-shaped first lens unit of forward convexity, a negative second lens unit having a front surface concave toward the front, a positive bi-convex third lens unit and a negative bi-concave fourth lens unit wherein the following conditions are satisfied:

$$-3.5<r3/f<-2.0$$

$$-1.8<r7/f<-0.5$$

$$1.4<r8/f<6.5$$

$$0<d6/f<0.017$$

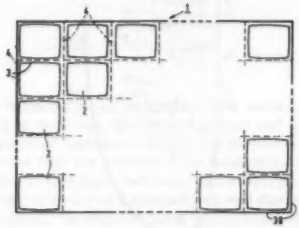
where f is the focal length of the entire system, r3 is the radius curvature of the paraxial region of the front surface of said second lens unit, r7 and r8 are the radii of curvature of the front and rear surfaces of said fourth lens unit, and d6 is the axial air space between said third and said fourth lens units when focused to infinity.

4,695,135

INFORMATION DISPLAY PANEL

Hendrikus B. Den Exter Blokland, and Petrus J. van Raay, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Oct. 11, 1985, Ser. No. 786,775
Claims priority, application Netherlands, May 17, 1985, 8501424
Int. Cl.[4] G02B *3/08, 27/22*
U.S. Cl. 350—452 14 Claims



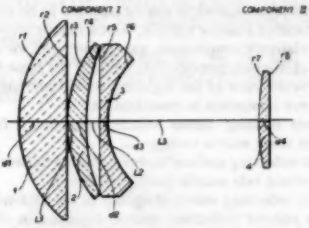
1. An information display panel comprising a plurality of information display units arranged in a rectangular matrix of rows and columns, each display unit comprising a picture tube having a faceplate with a curved surface and an image magnifying element secured thereto, said image magnifying element comprising a Fresnel lens spaced from said face plate, each said Fresnel lens exhibiting in two perpendicular directions a curvature which corresponds to the curvature of the respective faceplate, each said Fresnel lens being concentric with the surface of the respective face plate, said display unit being arranged so that respective Fresnel lenses form a unitary picture without discontinuities.

4,695,136

PROJECTION OBJECTIVE ASSEMBLY

Hiltrud Schitthof, Schweppenhausen, Fed. Rep. of Germany, assignor to Jos. Schneider Optische Werke Kreuznach GmbH & Co. KG, Kreuznach, Fed. Rep. of Germany

Filed Mar. 4, 1985, Ser. No. 707,615
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1984, 3407898
Int. Cl.[4] G02B *9/34, 15/08*
U.S. Cl. 350—472 12 Claims



1. A projection objective assembly for forming a set of at least two objectives with different focal lengths, comprising:

a first component common to all objectives of said set consisting of three lenses; and

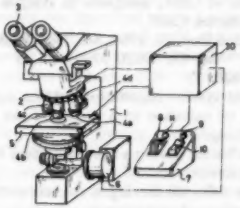
a plurality of interchangeable second components each consisting of at least one lens, spaced from said common component along a common optical axis therewith, said second components being replaceable by one another solely to select different overall focal lengths of objectives of said set.

4,695,137

MOTORIZED FOCUS DRIVE FOR A MICROSCOPE

Reinhard Jörgens, Oberkochen; Bernd Faltermeier, and Franz Trautwein, both of Aalen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany

Filed Feb. 26, 1986, Ser. No. 833,137
Int. Cl.[4] G02B *21/24;* G05B *1/06*
U.S. Cl. 350—521 11 Claims



1. A microscope having a focus drive which can be moved by motor and having an operating means by which the focus drive can be manually controlled, characterized by the fact that the operating means is a finger wheel (8) or knob which is coupled to an electronic bit-signal generator (encoder 18) and

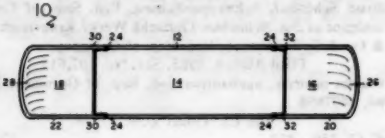
is located in a separate control console (7) set up next to the microscope (1).

4,695,138

PANORAMIC REAR VIEW AUTOMOBILE MIRROR

David Epstein, 54 Turning Mill Rd., Lexington, Mass. 02173

Filed Nov. 26, 1986, Ser. No. 934,948
Int. Cl.[4] B60R *1/04, 1/08*; G02B *5/10, 7/18*
U.S. Cl. 350—615 10 Claims



1. A panoramic rear-view mirror adapted to be mounted on the windshield of a motor vehicle, which mirror provides a one position, relatively continuous, panoramic rear view without distortion of distance perspective, while at the same time keeping the forward view of the highway within peripheral vision, which mirror comprises in combination:

(a) mirror housing means which comprises a first and a second wing mirror casing;

(b) a flat reflecting surface mirror centered between the first and second side mirror casings;

(c) a first reflecting mirror disposed in the first wing casing and a second reflecting mirror disposed in the second wing casing, the first and second mirrors in the same vertical plane as the center mirror, and the adjacent mirror edges closely adjacent to the respective edges of the central mirror to provide a substantially continuous reflecting mirror view;

(d) the first and second mirrors having a flat surface reflecting area and a convexly curved mirror surface area at the exterior peripheral edge, the flat surface occupying a substantial area portion of said mirror to provide minimal distortion of distance perspective;

(e) first adjustment means to secure the first and second casings to the central mirror and to move the first and second casings about a vertical axis with respect to the central mirror;

(f) second adjustment means to move the first and second mirrors within the respective casings about a horizontal axis within the respective casings; and

(g) means to connect at a defined distance the central mirror to the motor vehicle.

4,695,139

PLURAL-ZONE MIRROR FOCUSING SYSTEM

John P. Bagby, Anaheim Hills, and Richard L. Hedden, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 26, 1984, Ser. No. 686,334
Int. Cl.[4] G02B *17/06, 17/08*
U.S. Cl. 350—620 5 Claims

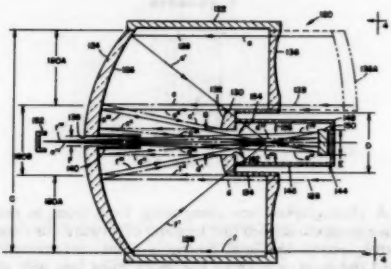
1. An optical system capable of guiding radiation from a distant source of radiation to a sensor of the radiation, said system comprising:

a primary reflector having a curved surface facing radiation from said source;

a secondary reflector having a curved surface facing the curved surface of said primary reflector;

at least one of said curved surfaces comprising a set of concentric zones for receiving radiations reflected from the other of said curved surfaces for the forming of an image of said object; wherein

said surfaces are disposed relative to each other to implement a sequence of multiple reflections of rays of radiant energy from said object to said image, said sequence of multiple reflections increasing the focal length of said optical system to provide for a reduced viewing angle and increased offaxis rejection of extraneous radiation, each of said zones being positioned for intercepting only one leg of a pass in said sequence of reflections, and each of said zones being separately formulated for adjusting the orientation of a leg of said sequence of reflections to compensate for aberrations in the forming of said image; and wherein



the curved surface of the primary reflector is concave and the curved surface of said secondary reflector is convex; said system further comprising

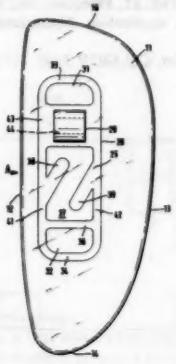
first and second apertures disposed respectively in said primary reflector and said secondary reflector, one of said apertures being positioned for receiving reflections in said series of reflections, and wherein said system further comprises means for directing radiation between said apertures for the formation of an image of said object behind one of said reflectors.

4,695,140

PAD

Walter H. Bononi, Fellbach-Schmiden, Fed. Rep. of Germany

Filed Dec. 23, 1983, Ser. No. 564,709
Claims priority, application Fed. Rep. of Germany, Dec. 28, 1982, 82366322[U]
Int. Cl.[4] G02C *1/00, 5/02*
U.S. Cl. 351—139 7 Claims



1. A pad adapted to be fastened angularly movable to pad levers of spectacle frames comprising:

(a) a kidney-shaped pad body, which has a skin contact surface merging, with circumferential radii, in a rear surface which is spaced from the skin contact surface,

(b) an anchoring plate, having a plane around which the pad body has been cast and which has an elongated contour in the longitudinal extension of the pad body and is substantially thinner than the pad body,

(c) a finger having a free end zone which projects perpendicularly from the anchoring plate and which passes through the rear surface of the pad body and in its free end zone has a cross hole which extends transversely to the longitudinal extension of the pad body, the anchoring plate and the finger being of the same material,

(d) and the improvement wherein:

(1) The pad body consists of glass-clear silicone rubber having Shore-D hardness of 10–30 according to DIN 53 305, and

(2) The anchoring plate consists of a transparent plastic material that is harder than the pad body; the length of the anchoring plate is several times greater than its width; and the elongated contour of the anchoring plate extends perpendicularly and substantially beyond the finger and comprises a lattice-work of openings and small rods in an ajoure arrangement that facilitates flexure of the anchoring plate together with the pad body while providing a sufficient anchoring area to secure the anchoring plate substanially undetachably in the pad against forces extending longitudinally substantially over the anchoring plate in a direction substantially parallel to the finger.

4,695,141

METHOD FOR THE PRODUCTION OF A COMBINED LIVE-ACTION AND ANIMATION MOTION PICTURE FILM

Raoul Servais, Middelkerke, Belgium, assignor to AGFA-Gevaert N.V., Mortsel, Belgium

Filed Dec. 18, 1985, Ser. No. 810,356

Claims priority, application European Pat. Off., Dec. 24, 1984, 84116294.4

Int. Cl.[4] G03B *19/18*

U.S. Cl. 352—50 **9 Claims**

1. In a method for the production of a motion picture film combining at least one live-action subject and animation, in which a series of successive frames of a motion picture photographic color film are exposed in an animation camera to the combination of a background image and a superposed transparent cell sheet of such live action subject, and then photographically processed, the improvement which comprises the steps of:

(a) producing photographic positive-type transparent enlargements of the images of selected frames of a black and white generally continuous tone live-action film of at least one subject, such enlargement carrying its image in a format which corresponds with the format of said background image, said image of such enlargement having a generally continuous tone grey gradation generally corresponding to the gradation of the image of the corresponding frame of said live subject film,

(b) producing subject contour images from the subject enlargements by hand-tracing onto a drawing sheet the controus of the distinct areas of the images of said subject enlargements,

(c) superimposing a transparent cell sheet upon each said subject contour image and applying to the areas of said cell sheet delineated by the underlying contour image opaque colorant of appropriate coloration to said live action frames, and

(d) forming a sandwich of each subject enlargement in registration with the corresponding cell sheet and combining said sandwich with the background image for the exposure of a frame of said motion picture film in said animation camera.

4,695,142

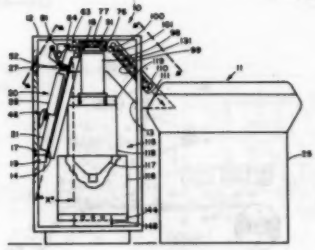
AUTOMATIC PHOTO IMAGING SYSTEM

David R. Holt, Rockford, Ill., assignor to Harold A. Williamson, Rockford, Ill.

Filed Jul. 25, 1985, Ser. No. 758,786

Int. Cl.[4] G03B *29/00*; G01D *9/42*; G03G *21/00*

U.S. Cl. 354—76 **21 Claims**



1. An automatic multi photo imaging system employing multiple single sheet film, said system comprising

a single sheet film transport means operative to receive single sheets of film and mechanically deliver said single sheet along a film sheet path to a first film image exposure row position, said image exposure row being at right angles to said film path,

said film transport means further having means to detect an arrival of said film sheet when said film sheet is adjacent said first film image exposure row position and to stop said film sheet movement along said path,

a video monitor projector means mounted for movement at right angles to said film sheet path, said projector means including a video monitor tube coupled by a projection conduit having one open end secured to said video monitor and configured to match said video monitor, said conduit having the other open end positioned immediately adjacent said film path, said other open end configured to match the boundries of an image to be projected upon said film.

said projection conduit having therein a remote, shutter controlled single lens,

said video projection means having driving means to move said projection means incrementally back and forth across said film sheet in a single degree of freedom path to thereby establish a first row of images across said film sheet upon the actuation of said remote shutter controlled single lens at each incremental movement of said video projection means,

said transport means including means to advance said film sheet along said filmsheet path to thereby present said conduit other open end to unexposed film and thereby

establish another row of possible images across said sheet of film by the use of said single lens moveable in said single degree freedom path,

said single sheet film transport means including multiple apertured image boundry defining means positioned between said video monitor projection means remote open end and said film sheet when said film sheet is at said first film image exposure row position,

said remote conduit opening configuration matching said aperatures in said image boundry defining means to thereby ensure precisely defined image formation on said film as said video monitor projector means incrementally moves from apperture to apperture in said image boundry defining means.

4,695,143

INSTANT PHOTOGRAPHIC APPARATUS

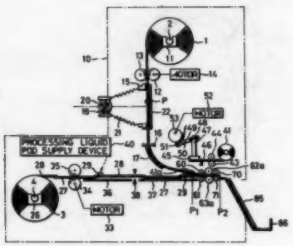
Yuji Oshikoshi, Tokyo; Masashi Kato, and Hisashi Kikuchi, both of Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 28, 1986, Ser. No. 823,279

Claims priority, application Japan, Jan. 28, 1985, 60-12676; Jan. 28, 1985, 60-12677; Jan. 28, 1985, 60-12678

Int. Cl.[4] G03B *17/50*

U.S. Cl. 354—86 **17 Claims**



17. An instant photographic apparatus in which a processing liquid is distributed between superposed exposed photosensitive and image-receiving members so as to produce on said image-receiving member a positive image corresponding to a latent image created on said exposed photosensitive member by means of diffusion transfer processing, said apparatus comprising means for separately advancing an exposed photographic member and an image-receiving member toward a superposing position, and means within said apparatus for withdrawing a pod of the processing liquid from a supply source comprising a plurality of said pods, and depositing said pod on the exposed photosensitive member or the image-receiving member before being superposed in contact with each other.

4,695,144

DRIVE APPARATUS OF LENS AND EXPOSURE MECHANISM BY MOTOR

Tsunemi Yoshino, Nara; Katsuji Ishikawa, Higashiosaka, and Hiroshi Iwata, Ikoma, all of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Aug. 25, 1986, Ser. No. 899,914

Claims priority, application Japan, Aug. 4, 1985, 60-186132; Aug. 24, 1985, 60-186131

Int. Cl.[4] G03B *1/18*

U.S. Cl. 354—195.11 **14 Claims**

1. A drive apparatus of lens and exposure mechanism by a motor comprising:

a motor as a drive source which rotates both in normal direction and reverse direction,

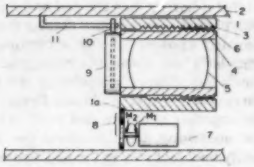
a rotary member mounted on a frame of an optical lens appratus,

transmission means for transmitting rotating force of said motor to said rotary member,

a lens barrel which holds the lens and is disposed at a specified position inside said rotary member,

force-direction conversion means for converting operating direction, being disposed between said rotary member and lens barrel to transmit the rotating motion of said rotary member to said lens barrel through a predetermined frictional force, making said lens barrel move linearly,

an exposure mechanism affixed to said lens barrel, having a drive member which causes plural blade members provided inside the main body open and close by moving thereof, and



a protruding member which projects from said frame and is engaged with said drive member in a manner to allow a linear motion of said lens barrel in the direction parallel to optical axis of said lens and to prohibit rotation of said drive member around said optical axis,

whereby said lens barrel is moved to a predetermined position, together with said exposure mechanism, by the rotation of said motor in a predetermined direction, and said drive member of said exposure mechanism is moved to a predetermined position by a rotation in the reverse direction of said motor.

4,695,145

MOTOR BUILT-IN LENS MOUNTING

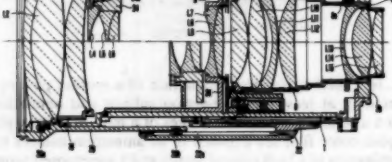
Kenichi Kawamoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Japan

Filed Feb. 3, 1986, Ser. No. 825,191

Claims priority, application Japan, Feb. 7, 1985, 60-16216[U]; Dec. 27, 1985, 60-204709[U]

Int. Cl.[4] G03B *9/06*

U.S. Cl. 354—271.1 **6 Claims**



1. A diaphragm device comprising:

(a) a magnet rotor having an aperture through which light passes, said rotor being magnetized about an optical axis;

(b) an exciting coil and yoke arranged on an outer or inner periphery of said magnetic rotor;

(c) a diaphragm unit drivenly connected to said magnetic rotor; and

(d) bearing means for bearing said magnetic rotor, said bearing means including bearing balls, holes or a recess for said

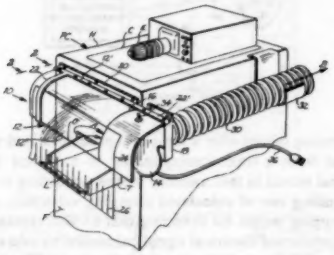
balls directly formed in one end portion of an axial length of said magnetic rotor, and a receiving member for receiving said balls, said receiving member being fixedly secured to a stationary member in a lens barrel, said magnetic rotor being supported by said receiving member rotatably around the optical axis by means of said bearing balls.

4,695,146

FUME EXHAUST SYSTEM FOR PHOTO PRINT PROCESSORS

Charles L. Fuller, 2340 Loma Linda St., Sarasota, Fla. 33579

Filed Oct. 10, 1986, Ser. No. 917,772
Int. Cl.[4] G03D *13/00*
U.S. Cl. 354—309 **6 Claims**



1. A fume and heat exhaust system adapted for installation in conjunction with the front panel of a photo print processor the front panel having a photo discharge opening and a photo tray below the discharge opening, said system comprising:

an air blower having an inlet and an outlet;

a rigid hood having opposing upper and lower edge margins and opposing right and left end margins, said hood contoured of a thin sheet of material for mating alignment of said hood right end margin with said blower inlet;

hood mounting means for attaching said hood along said hood upper edge margin against the front panel of the photo print processor above the photo discharge opening;

blower mounting means for positioning said blower inlet adjacent said hood right end margin;

said hood extending outwardly and downwardly from said hood upper edge margin to said hood lower edge margin, said hood lower edge margin positioned such that said hood substantially covers the photo discharge opening and tray;

said blower outlet directed away from the photo discharge opening and tray.

4,695,147

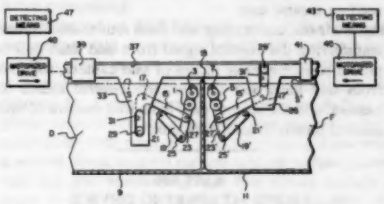
APPARATUS AND METHOD FOR PREVENTING THE FORMATION OF A DEPOSIT FROM A PROCESSING SOLUTION ON A FILM TRANSPORT MEMBER

Jean Thibault, Chalon sur Saone, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 8, 1986, Ser. No. 916,593
Claims priority, application France, Dec. 23, 1985, 85 19016
Int. Cl.[4] G03D *3/08*
U.S. Cl. 354—322 **12 Claims**

1. An improved photographic processing apparatus of the type wherein transport means is operated to transport a photosensitive material along a predetermined path through a free surface of a volume of processing solution, and wherein the improvement comprises:

means for moving said transport means to an operative position elevated at least partially above the free surface of the processing solution, to enable said transport means to be operated to transport the photosensitive material along the predetermined path through the free surface of the processing solution, and to a non-operative position immersed in the processing solution below its free surface, to prevent the formation of a deposit from the solution on



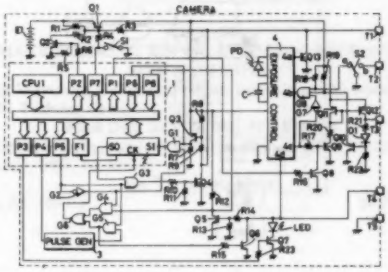
said transport means generally during non-use of the transport means.

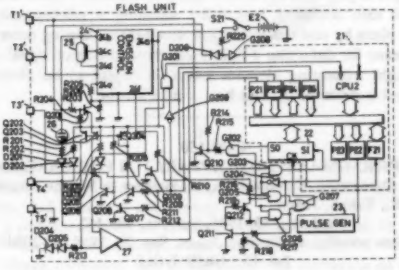
4,695,148

FLASH PHOTOGRAPHING SYSTEM

Nobuhiko Terui, Tokyo, and Hisatoshi Takahata, Sakura, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed May 12, 1986, Ser. No. 861,712
Claims priority, application Japan, May 15, 1985, 60-103361
Int. Cl.[4] G03B *15/03*
U.S. Cl. 354—413 **4 Claims**





1. A flash photographing system comprising:

a flash unit including flash emitting means and data control means, said flash emitting means being provided with a flash tube and circuit means for energizing said flash tube, said data control means being provided with data generating means for generating first data concerning with said flash unit, data reading means, and means for generating a control signal prior to the first data;

a camera including power source means, power source control means for enabling said power source means in response to the control signal, and data control means

driven by said power source means, and said data control means being provided with data generating means for generating second data concerning said camera, and data reading means; and

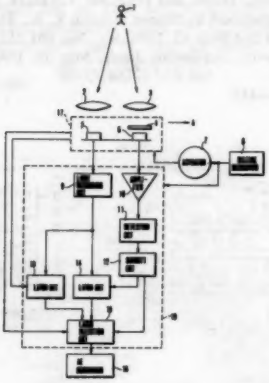
transfer means, connecting said flash unit to said camera, for transferring the control signal from said flash unit to said power source control means of said camera, the first data from said flash unit to said data control means of said camera, and the second data from said camera to said data control means in said flash unit.

4,695,149

LIGHT MEASURING DEVICE

Masao Shikaumi, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Japan

Filed Apr. 29, 1986, Ser. No. 857,237
Claims priority, application Japan, May 9, 1985, 60-098252
Int. Cl.[4] G03B *7/08*
U.S. Cl. 354—430 **10 Claims**



1. A light measuring device comprising a sensor portion including a light measuring element and a heat source sensor arranged in positions to receive light substantially from a same optical axis; scanning means for scanning a photographic image plane by said sensor portion; and light measuring detecting means for detecting a light measurement output signal of said light measuring element when an object to be photographed is detected by said heat source sensor.

4,695,150

DIAPHRAGM-CONTROL APPARATUS FOR CAMERA

Akira Ogasawara, Kawasaki, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Sep. 19, 1986, Ser. No. 909,462
Claims priority, application Japan, Sep. 20, 1985, 60-208474
Int. Cl.[4] G03B *7/095*
U.S. Cl. 354—448 **3 Claims**

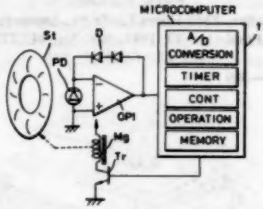
1. A diaphragm-control apparatus for controlling stopping-down of an aperture of a photographing lens for a camera to obtain a desired aperture value, including:

(a) light metering means for detecting an intensity of light reflected by an object to be photographed and transmitted through said aperture and sequentially generating electrical signals each corresponding to a detected light intensity;

(b) memory means for storing a predetermined number of electrical signals;

(c) storing means for sequentially storing the electrical signals in said memory means, said storing means being adapted to store the electrical signal in place of an oldest electrical signal stored in said memory means;

(d) operating means for sequentially calculating changing velocities represented by the electrical signals during stopping-down according to the predetermined number of electrical signals stored in said memory means, said operating means being adapted to sequentially calculate a predicted electrical signal to be produced by said light



metering means after a lapse of a predetermined period of time from a time corresponding to a newest electrical signal stored in said memory means, according to a corresponding one of calculated changing velocities; and

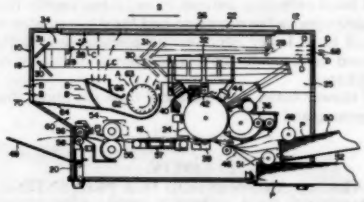
(e) stopping means for detecting that a value represented by the predicted electrical signal calculated by said operating means has a predetermined relationship with the desired aperture value, and for interrupting the stopping-down.

4,695,151

IMAGE FORMING APPARATUS

Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1985, Ser. No. 788,724
Claims priority, application Japan, Oct. 26, 1984, 59-225308
Int. Cl.[4] G03G *15/00, 15/12*
U.S. Cl. 355—3 R **10 Claims**



1. An image forming apparatus which illuminates an original for exposure to form an image corresponding to reflected light from the original, comprising:

an exposure table to carry the original thereon;

an optical unit for exposing the original on the exposure table, said optical unit including a light source;

ventilating means for ventilating the interior of the optical unit, said ventilating means including a first fan, first duct means for guiding air from the first fan to the outside of the optical unit, and second duct means for returning part of the air from the first fan to the optical unit; and

a photosensitive drum adapted to be illuminated with the reflected light from the original to form thereon a latent image corresponding to the image of the original, wherein said first fan has an axial dimension substantially equal to the longitudinal dimension of the photosensitive drum.

4,695,152

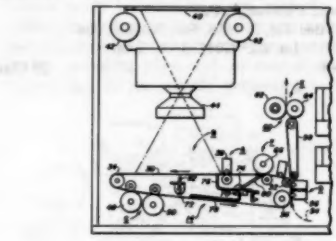
CHARGE ERASE DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE

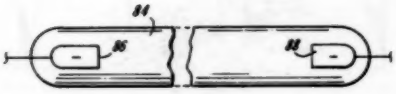
Charles J. Urso, Jr., Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 676,030, Nov. 28, 1984, abandoned. This application Nov. 18, 1985, Ser. No. 798,370

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 R 2 Claims





1. An electrophotographic printing machine comprising: a photoconductive member; means for forming a charge on the surface of said member, means for exposing said surface so as to form a latent electrostatic image on said surface and means for reducing the charge in at least one region of said surface, said charge reduction means including at least one lamp, said lamp comprising an elongated tubular glass envelope having cold cathode electrodes sealed into its opposite ends and containing neon at a pressure range of 18–25 torr, said lamp operating over a current range of 5 to 50 ma(rms);

wherein said lamp operates at a current of approximately 35 ma (rms) and at a pressure range of approximately 21 torr.

4,695,153

DOCTOR BLADE POSITIONING IN ELECTROPHOTOGRAPHIC COPYING MACHINES

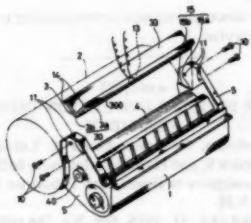
Mitsuo Matsushita, Higashiosaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jan. 29, 1986, Ser. No. 823,865

Claims priority, application Japan, Jan. 30, 1985, 60-11911[U]

Int. Cl.[4] G03G *15/08, 15/09*

U.S. Cl. 355—3 DD 5 Claims



1. In a developing apparatus of an electrophotographic copying machine which comprises a developing housing having side walls which support a developing sleeve having a cylindrical surface for transporting a developer and a doctor blade which regulates the amnount of developer transported by said developing sleeve, a supporting means for supporting and positioning said doctor blade with respect to said developing sleeve comprising:

means arranged at said housing side walls for rotatably supporting said developing sleeve at ends thereof for rotation about an axis of said cylindrical surface;

said doctor blade having a leading surface edge formed thereon by a pair of control surfaces including a first planar control surface parallel to said axis and lying on a normal line with respect to said developing sleeve axis and a second planar control surface lying in a plane parallel to said axis and intersecting said first planar surface at an angle θ such that $90° > \theta > 0°$, the intersection of said planar surfaces forming a leading surface edge extending in the same direction as said axis of said sleeve; and

a supporting means for supporting said doctor blade at said control surfaces comprising a pair of supporting sections formed, respectively, at each of said housing side walls, said supporting sections each comprising a first planar supporting surface parallel to said first control surface and a second planar supporting surface parallel to said second control surface, and means for hold said doctor blade control surfaces firmly against said supporting section supporting surfaces such that said leading surface edge is supported at a fixed distance from said cylindrical surface of said developing sleeve to regulate the amount of developer transported thereby.

4,695,154

IMAGE FORMING APPARATUS WITH DOCUMENT SIZE DETECTION

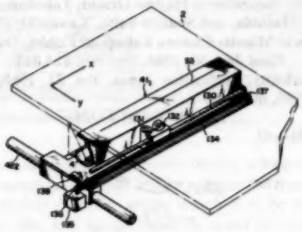
Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 20, 1985, Ser. No. 811,872

Claims priority, application Japan, Dec. 25, 1984, 59-278422; Dec. 27, 1984, 59-278228

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 24 Claims



1. An image forming apparatus with document size detection, said apparatus comprising:

a document table on which a document subjected to image formation is placed at one end side thereof;

image formation instruction means for supplying an image formation instruction;

document scanning means, movable along said document table, for scanning the document from the one end side to the other end side of said document table to obtain image data in accordance with the image formation instruction;

light emitting and receiving means provided on said document scanning means to be movable along a direction perpendicular to a moving direction of said document scanning means, and including a light emitting section for emitting light in a direction of said document table and a light receiving section for receiving a reflected component of light emitted by said light emitting section;

first control means for, in an initial state, setting said docu-

ment scanning means at a predetermined initial position of said document table and setting said light emitting and receiving means at a predetermined initial position on said document scanning means;

document size detection instruction means for supplying a document size detection instruction prior to the image formation instruction;

second control means for moving said document scanning means from the predetermined initial position in accordance with the document size detection instruction;

first detection means for detecting a change in amount of light received by said light receiving section, when said light emitting and receiving means has reached one side portion of the document, upon movement of said document scanning means by said second control means;

third control means for moving said light emitting and receiving means from the predetermined initial position in accordance with the detection signal from said first detection means;

second detection means for detecting, upon movement of said document scanning means and said light emitting and receiving means by said first and third control means, a change in amount of light received by said light receiving section when said light emitting and receiving means has reached the other side portion of the document;

document size calculation means for calculating two dimensions of the document based on the detection signals from said first and second detection means;

image forming means for transferring the image data from said document scanning means onto an image forming medium at a predetermined magnification; and

fourth control means for generating a control signal required for at least one of said document scanning means and said image forming means based on the calculation result from said document size calculation means.

4,695,155

READER-PRINTER HAVING AN IMAGE ROTATION DEVICE

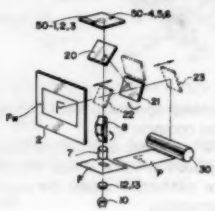
Kenjiro Ishii, Sagamihara; Yutaka Satoh, Yokohama; Fumio Fukumoto, Sagamihara; Hajime Otsuki, Yokohama; Yasuhide Kokura, Machida, and Shuichi Saito, Kawasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 30, 1986, Ser. No. 824,083

Claims priority, application Japan, Jan. 31, 1985, 60-17826; Mar. 20, 1985, 60-57457

Int. Cl.[4] G03B *13/28*

U.S. Cl. 355—45 **15 Claims**



1. A reader-printer comprising:

projection means for projecting an image of a microfilm to a screen and onto a photosensitive medium;

copy forming means for forming the image projected onto the photosensitive medium into copies;

feed means for feeding copy papers toward the photosensitive medium;

image rotation means disposed in a light path of said projection means for optically rotating the image;

drive means for driving said image rotation means;

direction detecting means for detecting the orientation of the projected image; and

control means for controlling said drive means so that the orientation of the projected image and the orientation of fed copy paper agree with one another in accordance with said direction detecting means.

4,695,156

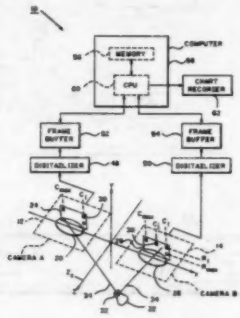
RANGE FINDING METHOD AND APPARATUS

Jeffrey D. Taft, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 3, 1986, Ser. No. 882,006

Int. Cl.[4] G01C *3/00, 5/00*

U.S. Cl. 356—1 **20 Claims**



1. A method for finding the range of a target object, comprising the steps of:

(a) viewing the target object from a first perspective, using a camera having a sensor with light-sensitive regions that are disposed in a row having ends, to provide a signal $V_A(I_A)$ corresponding to the first perspective, where V_A is a voltage proportional to light intensity at a light-sensitive region of the row and I_A is an integer corresponding to the distance between the respective light-sensitive region and a predetermined end of the row;

(b) viewing the target object from a second perspective, using a camera having a sensor with light-sensitive regions that are disposed in a row having ends, to provide a signal $V_B(I_B)$ corresponding to the second perspective, where V_B is a voltage proportional to light intensity at a light-sensitive region of the row and I_B is an integer corresponding to the distance between the respective light-sensitive region and a predetermined end of the row;

(c) finding a disparity function $D(I_A)$ which maps $V_A(I_A)$ onto $V_B(I_B)$ for every I_A in an interval, the interval including a plurality of consecutive integers;

(d) using the disparity function $D(I_A)$ to determine the range of the target object at a plurality of points on the target object; and

(e) providing electrical signals corresponding to the range to an output device.

4,695,157

SOLDER PROCESS INSPECTION DIFFUSER ASSEMBLY

Gary L. Schoenbaum, Newtown; Lewis A. Latanzi, Roxbury; Stephen L. Hedrick, and Harold V. Johnson, both of Danbury, all of Conn., assignors to Benchmark Industries Incorporated, Manchester, N.H.

Filed Oct. 11, 1985, Ser. No. 786,609

Int. Cl.[4] G01N *21/47*

U.S. Cl. 356—237 **12 Claims**

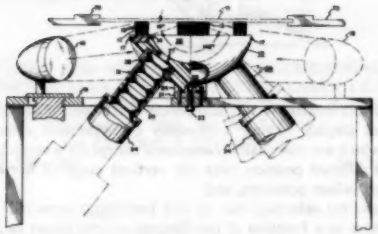
1. An optical inspection unit for inspecting an irregular surface of an object such as the solder surface of a substantially flat printed circuit board comprising

means supporting the object while exposing its surface to be inspected,

a maneuvering base adjacent to the supported object and having a mounting plate facing said surface and spaced therefrom,

X-Y maneuvering means associated with said base and said object supporting means and connected to produce successive relative repositioning movements of the plate and the surface upon command,

a thick-walled translucent concave dome having a hollow central cavity bounded by a rim, with the cavity being defined by an interior face arching internally away from said inspected surface, the dome being centrally mounted on the mounting plate with its central cavity opening toward and its rim closely juxtaposed to said surface,



substantially blocking external illumination from passing between said rim and said surface,

external illumination means aimed to direct illumination on the external face of the dome,

and inspection portal means formed in the dome each defined by a portal axis intersecting a central region of said surface to be inspected, through which optical inspection of said surface can be made,

whereby diffuse illumination of said surface substantially without bright spots, specular reflections or glare is produced within the cavity by attenuation of externally delivered illumination through absorption and internal reflection as it passes through the thick wall of the translucent concave dome, enhancing the precision of optical inspection of said surface performed through said inspection portal means.

4,695,158

FOCUS ERROR DETECTOR

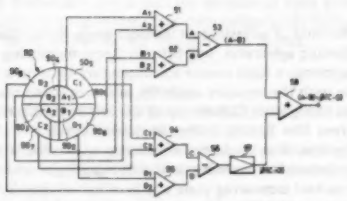
Fumitaka Kotaka, and Takanori Maeda, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 4, 1985, Ser. No. 707,553

Claims priority, application Japan, Mar. 2, 1984, 59-40633

Int. Cl.[4] G01J *1/36*

U.S. Cl. 356—123 **12 Claims**



1. A focus error detector for generating a focus error signal having a value indicating the degree that a lens system is out of focus by processing an illumination beam emitted by the lens system, the detector comprising:

means for generating an offset of said illumination beam in response to an out of focus condition;

first means for determining the first cumulative offset of the illumination beam from a focus point for a first circular area corresponding to a first predetermined radial distance from said focus point and for generating a first signal having a magnitude proportional to said first offset;

second means for determining the second cumulative offset of the illumination beam from said focus point for a second annular-shaped area corresponding to a second predetermined radial distance from said focus point not less than said first predetermined radial distance and a third predetermined radial distance from said focus point greater than said second predetermined radial distance, and for generating a second signal having a magnitude proportional to said second offset;

means for amplifying said second signal; and

means for arithmetically combining said first and second signals to produce the focus error signal.

4,695,159

IMPROVEMENTS IN SIGHTS FOR FIREARMS AND OTHER ARTICLES

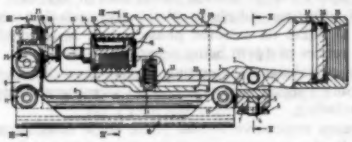
Albert W. Cannon, Poole, England, assignor to Focalpoint Armoury Limited, England

Filed Feb. 7, 1985, Ser. No. 699,140

Claims priority, application United Kingdom, Feb. 7, 1984, 8403242

Int. Cl.[4] G01C *9/02*; **F41G** *1/32*

U.S. Cl. 356—247 **13 Claims**



1. A sight comprising a collimator having a front end and a rear end, a mount, a light unit and an adaptor for mounting the sight on a firearm or other article which is to be aimed at a target or the like, said mount being mounted on said adaptor and said collimator being mounted for universal pivotal movement on the mount, said mount having adjusting means for adjusting the angular position of the collimator relative to the mount and locking means for locking the collimator in any desired adjusted position said collimator having means at said front end which are engageable by said adjusting means and said locking means, said light unit being located at the front end of the collimator and being arranged to emit a light spot towards the rear end of the collimator and said rear end of the collimator having an opening through which the light spot can be viewed, wherein a housing projects upwards from a main body part of the mount and is located in front of the front end of the collimator, said adjustment means and locking means being incorporated in the housing and the light unit comprising a light collecting member adapted to collect, amplify and emit ambient light, said light unit being surrounded by a casing of transparent material secured to the front end of the collimator and extending between the front end of the collimator and the housing.

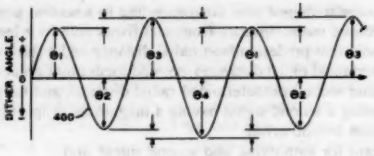
4,695,160
ERROR CANCELLING BIAS SYSTEM

Werner H. Egli, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 280,955, Jul. 6, 1981, abandoned. This application Jan. 15, 1982, Ser. No. 339,357

Int. Cl.⁴ G01C *19/64*

U.S. Cl. 356—350 **11 Claims**



1. A ring laser angular rate sensor comprising:

support means for supporting two counter-traveling waves of substantially monochromatic electromagnetic radiation substantially traveling about a closed-loop path, wherein the frequency of each of said waves is a function of the rate of rotation of said closed-loop path, and there being a corresponding phase relationship established between said waves also being a function of the rate of rotation of said closed-loop path;

means responsive to said waves for providing a sensor signal related to the true angle of rotation of said closed-loop path;

phase angle detector means, responsive to said waves for providing at least one output signal related to the instantaneous phase, ψ, of said phase relationship between said waves;

biasing means responsive to a bias control signal, for varying the frequency of at least one of said waves and said corresponding phase relationship between said waves, said bias control signal capable of

(i) periodically varying the frequency of at least one of said waves such that the frequency difference between said waves periodically alternates in sign, and

(ii) affecting said phase relationship such that said phase, ψ, takes on selected phase values at selected occurrences of $d\psi/dt$ being zero; and

bias control signal generating means for producing said bias control signal, said bias control signal generating means including,

means responsive to said phase angle detector means at least one output signal for determining at least a first phase value of said phase relationship at an occurrence of a first selected value of $d\psi/dt$, and

means responsive to said first phase value for determining at least one signal component of said bias control signal such that said bias control signal causes said biasing means to produce a second and a third phase value of said phase relationship at second and third subsequent occurrences of said selected value of $d\psi/dt$ such that said second phase value and said third phase value differ by a selected phase difference of substantially π radians.

4,695,161
AUTOMATIC RANGING GUN SIGHT

Larry T. Reed, Richardson, Tex., assignor to Axia Incorporated, Oak Brook, Ill.

Filed Aug. 6, 1984, Ser. No. 637,721

Int. Cl.⁴ G02B *27/36*

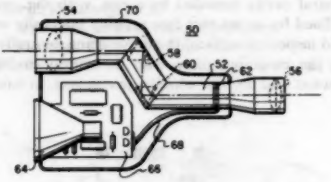
U.S. Cl. 356—254 **2 Claims**

1. An automatic ranging sight for a weapon which fires a projectile, comprising:

a housing supported on the weapon, the housing defining a plane of symmetry generally parallel the direction of projectile motion,

means for determining the distance from said weapon to a target mounted within said housing generally on a first side of said plane of symmetry,

an optical viewer mounted in said housing, said optical viewer having an optical path on the second side of the plane of symmetry at the end of the housing facing the target, the optical path being altered through a pair of prisms to lie on the plane of symmetry near the end of the housing away from the target for viewing by the weapon operator,



a reticle in said viewer, said reticle comprising a liquid crystal display having a plurality of horizontal cross-hair which are essentially transparent except for a cross-hair at a selected position over the vertical range of horizontal cross-hair positions, and

means for selecting one of said horizontal cross-hair positions as a function of the distance to said target as determined by said distance determining means whereby the selected cross-hair position provides elevation aiming to said target for said weapon while the optica path is uninterrupted by said distance determining means.

4,695,162
FILM THICKNESS MEASURING APPARATUS

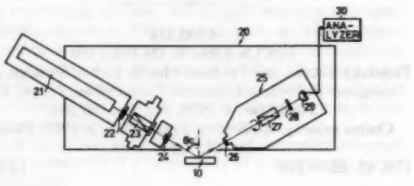
Makoto Itonaga, Yokohama, and Kanji Kayanuma, Hatano, both of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed May 22, 1985, Ser. No. 736,938

Claims priority, application Japan, May 24, 1984, 59-104920; Jun. 15, 1984, 59-123312

Int. Cl.⁴ G01J *4/00*

U.S. Cl. 356—369 **5 Claims**



1. A method of adjusting an incident angle θ_0 in a film thickness adjusting apparatus, said film thickness measuring apparatus comprising: a light source for impinging light on a measuring plate with the incident angle θ_0, said measuring plate comprising a transparent film on top of a transparent substrate, said transparent film having a film thickness which is to be measured by said film thickness measuring apparatus; a light receiving system for receiving and detecting light which is impinged on said measuring plate and is reflected thereby; and an analyzer system responsive to an output of said light receiving system for measuring an angle Δ of the phase difference between two polarized light components of the reflected light from said measuring plate and for calculating the film thickness of said transparent film from said angle Δ of the phase difference, said method comprising the steps of:

placing an adjusting instrument on said measuring plate so that a bottom surface of said adjusting instrument rests on said measuring plate, said adjusting instrument comprising first and second side surfaces each forming a predetermined angle θ_0 with respect to the bottom surface thereof, said predetermined angle θ_0 being equal to a polarizing angle θ_b of said transparent film of said measuring plate, said first side surface of said adjusting instrument opposing to said light source;

positioning a reflecting mirror to be parallel to said second side surface of said adjusting instrument; and

adjusting the angle of light traveling from said light source toward said measuring plate so that light emitted from said light source and reflected by the said first side surface of said adjusting instrument and/or light emitted from said light source, passed through said adjusting instrument and reflected by said measuring plate and said reflecting mirror returns to said light source.

4,695,163

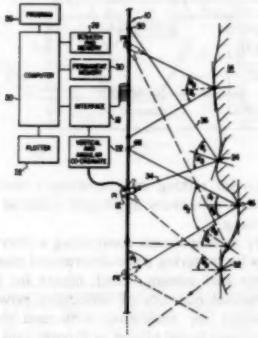
METHOD AND APPARATUS FOR DETERMINING SURFACE SHAPES USING REFLECTED LASER LIGHT

Ronald A. Schachar, 1020 N. Highway 75, Denison, Tex. 75020

Filed Jun. 17, 1985, Ser. No. 745,516

Int. Cl.[4] G01C *3/10*; G01B *9/08*

U.S. Cl. 356—369 **24 Claims**



1. A method for determining the surface shape of an object when the index of refraction thereof is known, comprising the steps of:

illuminating a plurality of points on the surface of the object with a plurality of light beams to produce a corresponding plurality of reflections, having various degrees of polarization;

detecting the amount of polarization of the reflections of said light beams; and

calculating spatial data of surface points of said reflections using Brewster's Angle and the amount of light polarization reflected therefrom, said data collectively being representative of the surface shape of said object.

4,695,164

POSITION DETECTOR AND MOUNT THEREFOR FOR A CENTRIFUGAL ANALYZER

Maury Zivitz; Eric Ko, and Mark Estlick, all of Houston, Tex., assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

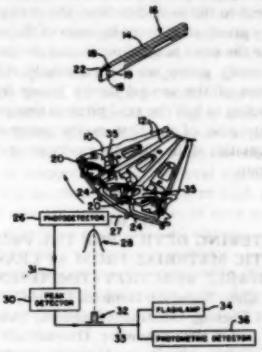
Filed Sep. 24, 1985, Ser. No. 779,520

Int. Cl.[4] G01N *21/90*, *1/10*

U.S. Cl. 356—427 **16 Claims**

1. In a centrifugal analyzer having a support, a rotatable rotor on the support, and an optical unit radially spaced from the axis of rotor rotation and having an optical path for optically analyzing a liquid in a cuvette when on the rotor and rotated thereby to the optical path of the optical unit, a position detector for detecting the rotational position of the rotor relative to the optical unit in which the cuvette will be in the optical path of the optical unit for the optical analysis, comprising:

a photodetector fixed to the support and having light emitting means for emitting light and light receiving means for



responding to the intensity of the light when reflected thereto; and

a member having a surface reflective of the light, convex to the photodetector, and movable with the rotor relative to the photodetector so as to sweep the light reflectively across the photodetector means for responding thereto for providing a continuously-curving response of the light receiving means.

4,695,165

CAVITY TRANSFER MIXING EXTRUDER

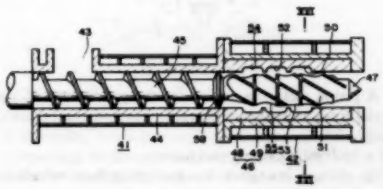
Shinnichi Fukumizu; Kimio Inoue, and Akimasa Kuriyama, all of Hyogo, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Oct. 14, 1986, Ser. No. 918,548

Claims priority, application Japan, Oct. 14, 1985, 60-229573; Feb. 24, 1986, 61-25998[U]; Mar. 7, 1986, 61-33484[U]

Int. Cl.[4] B29B *7/40*

U.S. Cl. 366—90 **3 Claims**



1. A cavity transfer mixing extruder comprising:

an extrusion unit which comprises a barrel provided with a feed opening in the rear portion thereof; and a screw shaft coaxially and rotatably extended through the barrel; and

a mixing unit which comprises a housing; a stator fixedly fitted in the housing and provided with a first cavity group including a plurality of circumferential rows of cavities located in the inner circumference thereof excluding opposite ends thereof; and a rotor joined coaxially to a front end of the screw shaft, coaxially and rotatably extended through the stator, and provided with a second cavity group including a plurality of circumferential rows of cavities in the outer circumference thereof excluding the

opposite ends thereof, wherein the respective cavities of the first and second cavity groups, when developed on a plane, each has a parallelogram shape defined by a pair of opposite, parallel straight walls extending perpendicularly to an axial direction, and a pair of opposite, parallel straight walls inclined at an angle to the axial direction; the longitudinal axes of the cavities of the first cavity group and the longitudinal axes of the cavities of the second cavity group being inclined in opposite directions with respect to the axial direction; the cavity rows of the first cavity group and the cavity rows of the second cavity groups are the same in axial pitch; and the cavity rows of the first cavity group are shifted axially relative to the cavity rows of the second cavity group by a distance corresponding to half the axial pitch so that each cavity of each cavity row of the first cavity group overlaps the adjacent cavities of the adjacent cavity rows of the second cavity group.

4,695,166

PISTON METERING DEVICE FOR THE PRODUCTION OF PLASTIC MATERIAL FROM AT LEAST TWO FLOWABLE REACTION COMPONENTS

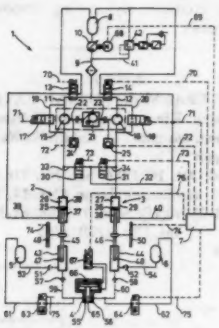
Klaus Schulte; Klaus Nadolski; Heinrich Ersfeld, all of Leverkusen; Wilfried Ebeling, Odenthal-Gloebusch; Heinrich Boden, Leverkusen, and Walter Schneider, Overath, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 6, 1986, Ser. No. 872,344

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1985, 3522153

Int. Cl.[4] B01F *15/04*

U.S. Cl. 366—160 **8 Claims**



1. A piston metering device for the production of a plastic material from at least two flowable reaction components comprising:

(a) a hydraulic driving mechanism

(b) a storage container for hydraulic fluid which is connected to the driving mechanism (a)

(c) a hydraulic metering pump which is connected to storage container (b)

(d) a pressure line with a change-over valve which line is connected to metering pump (b),

(e) two lines which branch from pressure line (d)

(f) a regulating element for each of the lines (e) made up of hydraulic motors rigidly coupled to one another,

(g) two piston metering units each of which is connected to one or the other of the branch lines (e) which metering units are made up of

(1) a working cylinder with a plunger piston and

(2) a storage container to which the plunger piston of (1) is connected

(h) two mixing stroke chambers each of which is connected to one or the other piston metering units (g)

(i) two filling stroke chambers each of which is connected to one or the other of the mixing stroke chambers (h)

(j) a mixer head to which each of the filling stroke chambers (i) leads and which is connected to each of the storage container (g)(2) and

(k) two return lines each of which leads back from one or the other filling stroke chamber (i) through the change-over valve and to one of the storage containers (g)(2).

4,695,167

APPARATUS FOR MIXING AND PUMPING SLURRY

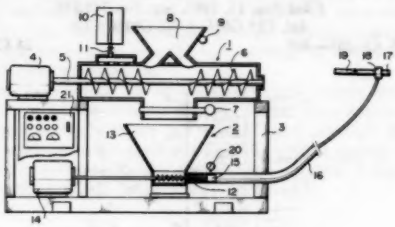
Masashi Mori; Shingo Nonaka, and Seiji Nagai, all of Okayama, Japan, assignors to Shinagawa Refractories Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1985, Ser. No. 786,858

Claims priority, application Japan, Nov. 30, 1984, 59-180808[U]

Int. Cl.[4] B01F *7/08, 15/02*

U.S. Cl. 366—181 **1 Claim**



1. Apparatus for mixing and pumping a binder slurry for admixture with a refractory aggregate material in a gunning nozzle comprising:

binder slurry mixing means comprising a slurry mixing vessel, means for metering a pre-determined quantity of liquid binder into said mixing vessel, means for introducing a pre-determined quantity of refractory powder into said mixing vessel for admixture with said pre-determined quantity of said liquid binder to form in said mixing vessel a refractory gunning binder slurry suitable for admixture in a gunning nozzle with a premixture of gunning refractory aggregate and solvent to form a castable refractory material suitable for application by gunning, agitating means mounted in said mixing vessel for admixing said liquid binder and refractory powder to form said binder slurry, means for discharging said binder slurry downwardly from said slurry mixing vessel, and means for actuating said binder slurry discharging means;

a frame supporting said binder slurry mixing means;

a pump comprising a rotatable member for pumping said binder slurry to a gunning nozzle for admixture with a premixture of gunning refractory aggregate and solvent to form a castable refractory material suitable for application by gunning, said pump being mounted on said frame means below said mixing vessel and having an inlet for receiving binder slurry from said mixing means and an outlet for delivering the binder slurry to a gunning nozzle;

hopper means mounted directly below said discharging means for receiving binder slurry discharged downwardly from said mixing vessel, said hopper means having an opening at the bottom thereof located directly above an opening in the upper portion of said pump whereby binder slurry received in said hopper means is able to flow directly into said pump;

means for varying the rotational speed of said rotatable pump member to vary the output thereof;

a gunning nozzle comprising means for admixing binder

slurry and a premixture of gunning refractory aggregate and solvent to form a castable refractory material suitable for application by gunning and an outlet for discharging said castable refractory material; and

hose means for conveying binder slurry from said pump outlet to said gunning nozzle;

whereby the ratio of binder slurry admixed with said premixture of gunning refractory aggregate and solvent can be controlled by regulating the rotational speed of said rotatable pump member independently of variation of the pressure within said gunning nozzle.

4,695,168

ELECTRONIC WATCH HAVING TWO MOTORS AND COMPRISING MEANS FOR PERPETUALLY INDICATING THE DAY OF THE MONTH

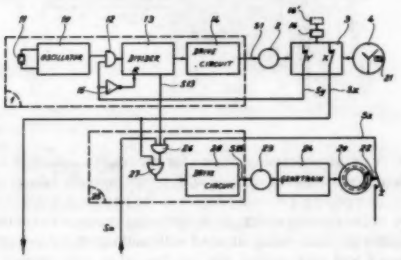
Pierre-André Meister, Bienne; Pierre Schmidli, Evilard, and Bertrand Soltermann, Diesse, all of Switzerland, assignors to ETA SA Fabriques D'Ebauches, Grenchen, Switzerland

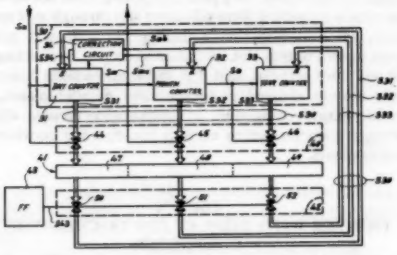
Filed Dec. 18, 1986, Ser. No. 943,013

Claims priority, application Switzerland, Dec. 18, 1985, 05437/85

Int. Cl.[4] G04B *19/24*

U.S. Cl. 368—31 **3 Claims**





1. An electronic watch which comprises:

a time keeping circuit able to generate a time base signal;

a first motor activatable by said time base signal;

a control mechanism including a first gear-train arranged to be driven by said first motor, a contact activatable daily by said first gear-train as the watch switches from one day to the next to generate a daily signal, and a correction number;

analogue time display means arranged to be driven by said first gear-train, and alterable by said correction member;

a perpetual-calendar circuit including day, month and year counters connected in series, and a correction circuit linked to the month and year counters, for setting to 1 the contents of the day counter at the end of each short month, said calendar being also arranged to generate, in response to the daily signal applied to the input of the day counter, a calendar signal, representative of the contents of the counters, showing the date and taking into account, by virtue of the correction circuit, the number of days in each month of the year and leap years, and a monthly signal as the calendar signal switches from one month to the next;

a second motor;

a second gear-train arranged to be driven by said second motor;

analogue display means for displaying the day of the month and controlled by said second gear-train;

a control circuit, connected to the calendar circuit and arranged to receive, in addition, said daily signal and a retrieval signal having a frequency greater than that of said daily signal, for issuing a control signal to said second motor, said control signal serving to alter the day of the month display by one day in response to said daily signal, and by the required number of days at the end of a short month in response to said retrieval signal, whereby the day of the month display will agree with the contents of the day counter on the first day of each month;

a cell for supplying energy to said circuit;

a reprogrammable non-volatile memory;

a first transmission circuit for transferring, as each day, each month and each year moves on to the next, the contents of said day, month and year counters, respectively, to said perpetual memory;

a replacement cell detection circuit arranged to generate a detection signal when the voltage of said replacement cell is applied across said circuits; and

a second transmission circuit for transferring, in response to said detection signal, the contents of said non-volatile memory to the counters of said calendar circuit.

4,695,169

STRUCTURAL BEARING

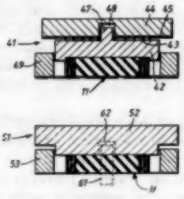
Balgent Maurice G., Somerset, England, assignor to AEPLC, Rugby, England

Filed Jan. 13, 1986, Ser. No. 818,327

Claims priority, application United Kingdom, Jan. 14, 1985, 8500822

Int. Cl.[4] F16C *41/00, 27/06*; E01D *19/04*

U.S. Cl. 384—36 **18 Claims**



1. A structural bearing assembly having a self-aligning support comprising: an elastomeric core support element, an annular reinforcement member surrounding said support element and integrally joined thereto; said member having a plurality of windings of tension resistant material in fibre form embedded in a matrix of an elastomeric material, said reinforcement member extending vertically from the top to the bottom of said support element and with said reinforcement member providing a free standing flexibly resilient support resistant to deformation in the form of lateral expansion.

18. A structural bearing assembly including a self aligning support located between an upper plate and a lower plate, said support comprising an elastomeric core of neoprene, said core having an integral outer reinforcing layer, said outer reinforcing layer comprising a spirally wound cord of poly (p-phenyleneterephthalamide) material embedded in an elastomeric material.

4,695,170

ENDLESS BALL SPLINE

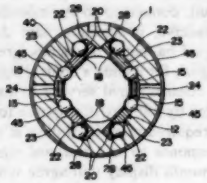
Hiroshi Teramachi, 34-8, Higashitamagawa 2-chome, Setagaya-ku, Tokyo, Japan

Filed Oct. 10, 1986, Ser. No. 917,579

Claims priority, application Japan, Oct. 15, 1985, 60-156509[U]

Int. Cl.[4] F16C *29/06*

U.S. Cl. 384—45 **1 Claim**



1. An endless ball spline comprising:

a spline bearing including an outer casing, a pair of cages fitted inside said outer casing and each having a ball recirculating groove, a pair of end covers respectively fitted on projections formed at both axial ends of said cages and secured to both axial ends, respectively, of said outer casing, and a multiplicity of balls disposed in ball recirculating endless tracks bores defined by said outer casing, said cages, and said end covers; and

a spline shaft supported through the multiplicity of balls in said spline bearing,

said outer casing including: grooves with a U-shaped cross-section provided in the inner peripheral surface thereof, said U-shaped grooves extending over the whole length of said outer casing in parallel with the axis thereof and in bisymmetry with each other; loaded ball guide grooves provided in both side surfaces, respectively, of the bottom of each of said U-shaped grooves; ridges with a triangular cross-section provided on the inner peripheral surface of said outer casing in such a manner that said triangular ridges extend axially over the whole length of said outer casing in parallel to each other and in symmetry with each other with respect to the plane which intersects the respective centers of said U-shaped grooves; cage securing grooves with a substantially trapezoidal cross-section provided on both sides, respectively, of each of said triangular ridges; and annullar slanted surfaces formed at both axial ends, respectively, of the inner periphery of said outer casing, each slanted surface expanding or diverging outward,

said cages having an inner peripheral surface with a substantially V-shaped cross-section, and each cage including: cage securing pieces provided at both longitudinal ends, respectively, of said cage; a plurality of annular grooves provided in the outer peripheral surface of said cage, said annular grooves including loaded ball grooves corresponding to the loaded ball guide grooves on said outer casing, said loaded ball grooves being formed in the substantially central portion of said cage and each having a slot with a diameter slightly smaller than the diameter of said balls; and non-loaded ball grooves formed on both lateral end surfaces of said cage, said non-loaded ball grooves being communicated with the corresponding loaded ball grooves through ball turning grooves which are provided at both ends, respectively, of each of said loaded ball grooves,

said end covers having a substantially U-shaped cross-section and each end cover including: a through-hole provided in its center and having a diameter slightly larger than the outer diameter of said spline shaft; ball turning grooves respectively corresponding to the ball turning grooves provided in said cages; a pair of axially extending ridges with a triangular cross-section provided on the inner peripheral surface of said end cover so that said triangular ridges can be respectively aligned with the corresponding triangular ridges formed inside said outer casing; and grooves with a substantially trapezoidal cross-section provided on both sides, respectively of each of said triangular ridges, and

said spline shaft having a substantially square cross-section and including loaded ball rolling grooves formed on both sides, respectively, of each of one pair of diagonally opposing corners thereof.

4,695,171

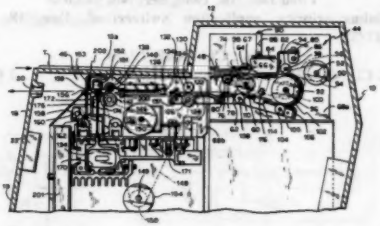
HORIZONTALLY OR VERTICALLY ORIENTABLE COMPACT TICKET PROCESSOR

Thomas P. Sapitowicz, Bel Air, Md., assignor to General Instrument Corp., New York, N.Y.

Filed Dec. 4, 1985, Ser. No. 804,523

Int. Cl.[4] B41J *3/516, 13/00*

U.S. Cl. 400—70 **10 Claims**



1. A ticket processing device for processing customer markable tickets, adapted for use with a substantially planar partition, comprising a housing adjacent the partition, a ticket input slot, ticket reading means, ticket printing means, a ticket output slot, the partition being situated with said input slot on one side thereof and said output slot on the other side thereof, and means for transporting a ticket through a substantially "U" shaped transport path, said path comprising three sections, said first section extending from said input slot through said reading means, said third section extending through said printing means to said output slot, said second section connecting said first and third sections, said first and third sections being relatively closely situated in substantially parallel planes, said second section comprising a substantially arcuate channel having a diameter which exceeds the distance between said parallel planes.

4,695,172

PRINTER WITH DISPLAY FOR DOUBLE-WIDTH CHARACTER

Hideo Ueno; Hiroshi Hattori, both of Nagoya; Kumiko Maeda, Ichinomiya, and Keiko Yamada, Ama, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Dec. 26, 1985, Ser. No. 813,563

Claims priority, application Japan, Dec. 29, 1984, 59-277667

Int. Cl.[4] B41J *3/46*

U.S. Cl. 400—83 **6 Claims**

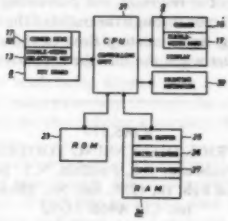
1. A printer which can print a double-width character with a display for a double-width character comprising:

a keyboard having cursor leftward and rightward shifting keys, a group of character keys and a double-width mode selection key, said keyboard generating a cursor position control signal, a character signal and a double-width mode signal in accordance with depression of said cursor keys, each of said group of character keys and said mode selection key respectively;

a display for displaying a preset number of characters and marks;

display control means for displaying each character on said

display according to said character signal from said keyboard and for displaying each character corresponding to said character signal in a position which a cursor of said display indicates together with a double-width mark in an adjacent position during said double-width mode; and



said display control means shifting said cursor leftward and rightward according to said cursor position control signal which is generated in accordance with depression of said cursor leftward and rightward shifting key respectively, and making said cursor jump the position of said double-width mark to indicate the next character.

4,695,173

PRINTING APPARATUS WITH A THERMAL PRINT HEAD

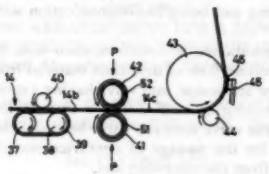
Yasutaka Tomida, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 681,682, Dec. 14, 1984, abandoned. This application Jul. 28, 1986, Ser. No. 889,307

Claims priority, application Japan, Dec. 20, 1983, 58-240610; Dec. 20, 1983, 58-240611

Int. Cl.[4] B41J *3/00*; D21H *1/22*

U.S. Cl. 400—120 **5 Claims**



1. A printing apparatus using a thermal ribbon having a thermally transferable ink layer to print on a sheet of paper, comprising:

a paper feeding device for feeding the sheet of paper;

a thermal pring head including heat generating elements which are held in pressed contact with the surface of said sheet of paper via said thermal ribbon, said heat generating elements being selectively energized to apply heat to said ink layer of the thermal ribbon to fuse the ink for adherence of the fused ink to the surface of the sheet of paper; and

smoothness improving means, disposed upstream of said thermal print head in the direction of feed of the sheet of paper by said paper feeding device, for improving the surface smoothness of the surface of the sheet of paper, said smoothness improving means comprising a humidifying device for humidifying and swelling said sheet of paper, a pressing device located downstream of the humidifying device for applying a pinching pressure to opposite surfaces of said swollen sheet of paper, and means for applying heat to the swollen sheet of paper downstream of the humidifying device.

4,695,174

MAGNETIC CIRCUIT FOR MATRIX PRINT HEAD

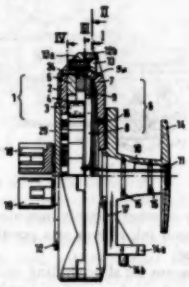
Bernd Gugel, Ulm-Einsingen; Harald Niebel, Senden, and Hubert Ott, Ravensburg, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 27, 1986, Ser. No. 822,874

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502469

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—124 **6 Claims**



1. A matrix print head including a common magnetic yoke plate, magnetic pole defining cores annularly arranged on said yoke plate, electromagnetic coils mounted on said cores, a common permanent magnet plate arranged in magnetic conductive relationship to said yoke plate; said yoke plate, said cores, said coils, and said permanent magnet plate establishing an electromagnetic assembly, there being additionally a common annular armature assembly including an armature plate and a plurality of deflectable radially extending armature arms, said armature assembly arranged in relation to the electromagnetic assembly such that the armature arms cooperate with said electromagnetic cores, there being print elements connected to said armature arms the improvement comprising:

said armature plate being an annulus that extends around a common center, and said radially extending armature arms being physically separated from the armature plate in radial direction but being resiliently interconnected to establish a single uncritical parasitic radial air gap; and

said magnetic yoke plate and said armature plate being radially, inwardly recessed vis-a-vis said permanent magnet plate, so that the permanent magnet plate has a larger radial outward extension through said yoke plate and said armature plate.

4,695,175

COLOR PRINTER HAVING APPARATUS FOR SHIFTING INK RIBBON

Tetsuo Tsukada, Kawasaki; Hideyuki Shimobuchi, Akishima, and Takahiro Yoshikawa, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 17, 1985, Ser. No. 788,566

Claims priority, application Japan, Oct. 23, 1984, 59-222607

Int. Cl.[4] B41J *32/02*

U.S. Cl. 400—196.1 **17 Claims**

1. A color printer, comprising:

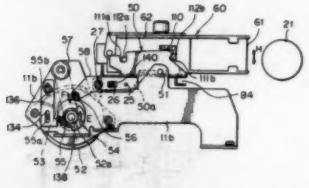
a base unit;

a cylindrical platen rotatably mounted on said base unit for supporting and guiding a printing paper;

a printing head;

a carrier reciprocally movable along said platen for supporting said printing head to reciprocally move said printing head along a printing line on the printing paper on said platen;

an ink ribbon supporting frame mounted on said base unit swingably about an axis parallel to said platen, said ink ribbon supporting frame being capable of having detachably mounted thereon a color ink ribbon cassette comprising a cassette case for accommodating therein a color ink ribbon which has a plurality of different color longitudinal stripes so that at least a part of said ink ribbon forms a loop exposed from and extending to the cassette case, which ribbon loop is positioned along said platen and between said printing head and platen, when the color ink ribbon cassette is set on said ink ribbon supporting frame;



a ribbon guide member slidably mounted on said carrier for supporting said ink ribbon at a position adjacent to said printing head;

slide shifting means for slide shifting said ribbon guide member so that a desired one of said color stripes of the ink ribbon is positioned on said printing line; and

swing shifting means for swing shifting said ink ribbon supporting frame so that the position of the cassette case substantially follows that of the shifted position of the ink ribbon, said swing shifting means being driven in accordance with said slide shifting means.

4,695,176

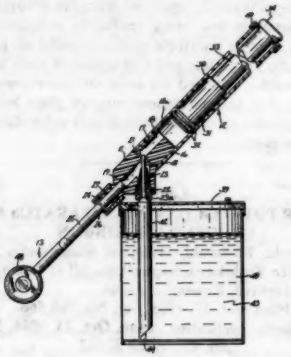
FOUNTAIN APPLICATION HANDLE WITH REFILL VALVE

Dallas W. Simonette, Stacy, and Bruce A. Wiener, Shoreview, both of Minn., assignors to Power-Flo Products Corporation, Minneapolis, Minn.

Filed Feb. 5, 1986, Ser. No. 826,197

Int. Cl.[4] B65B *3/04*; B05C *1/10*

U.S. Cl. 401—144 **20 Claims**



1. Fountain applicator for providing a continuous supply of a liquid coating including a reservoir for storing the liquid coating, a central channel having an inlet in communication with the reservoir and having an outlet, a fill channel extending angularly across and intersecting with the central channel between the inlet and outlet, and a fill tube in fluid communication with a source of liquid coating, with the improved fountain applicator comprising, in combination: first sealing means located in the fill channel spaced from the central channel for preventing flow of the liquid coating from the fill channel and for allowing insertion of the fill tube into the fill channel; and second sealing means located adjacent the intersection of the fill channel with the central channel for sealing with the fill tube when inserted in the fill channel for allowing the liquid coating to pass from the fill tube through the inlet of the central channel into the reservoir and preventing liquid coating flow from the fill tube through the outlet of the central channel and for allowing liquid coating flow in the central channel through the outlet when the fill tube is removed from the fill channel.

4,695,177

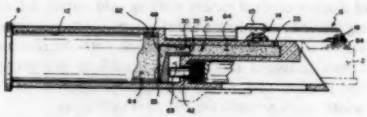
DENTIFRICE DISPENSING TOOTHBRUSH

Youti Kuo, 88 Foxbourne Rd., Penfield, N.Y. 14526

Filed Feb. 18, 1986, Ser. No. 830,467

Int. Cl.[4] A46B *11/02*

U.S. Cl. 401—150 **8 Claims**



1. A dentifrice dispensing toothbrush comprising:

a. a housing;

b. a reservoir situated within the housing for storing dentifrice material;

c. a brush which contains a head member and a set of bristles having their bottom end portions attached to the head member and their top end portions unattached so as to collectively provide a brush surface for supporting dentifrice material, said brush being releasably attached to the housing;

d. an applicator for depositing dentifrice material directly onto the brush surface, said applicator being attached to the housing and being in communication with the reservoir;

e. a valve positioned in communication with the reservoir for controlling flow of dentifrice material from the reservoir to the applicator, said valve having a stem and a head and containing an orifice which extends longitudinally through the valve stem and valve head so as to provide an opening for the passage of dentifrice material which is pumped from the reservoir; and

f. pumping means for applying pressure to cause dentifrice material to flow from the reservoir to the applicator.

4,695,178

JOINT FOR REINFORCING BAR EMPLOYED IN CONCRETE CONSTRUCTION

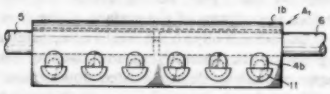
Yoshiyuki Era, Chiba, and Yasuo Kumagai, Saitama, both of Japan, assignors to Okabe Co., Ltd., Tokyo, Japan

Filed Jul. 18, 1986, Ser. No. 887,719

Claims priority, application Japan, Jul. 30, 1985, 60-117080[U]

Int. Cl.[4] B25G *3/00*

U.S. Cl. 403—14 **2 Claims**



1. A joint for connecting a pair of reinforcing bars together end-to-end, said joint comprising:

a joint main body having a generally U-shaped cross section defined by a pair of side walls extending parallel to and spaced from one another, and a generally outwardly curved wall extending between said pair of side walls,

each of said side walls having a plurality of wedge bores extending therethrough, said plurality of wedge bores spaced from one another respectively along each of said side walls in the direction in which said side walls extend parallel to one another along the length of the main body, each of said wedge bores extending through one of said pair of side walls being aligned with a respective one of said wedge bores extending through the other of said pair of side walls thereby defining a plurality of pairs of aligned wedge bores;

said curved wall having an inner V-shaped surface defined by a pair of substantially flat surfaces extending between the surfaces of said side walls that face each other and against which end portions of said pair of reinforcing members abut;

a respective wedge extending through each of said pairs of aligned wedge bores, each said respective wedge contacting a respective said end portion of said pairs of reinforcing bars for urging said end portion against said inner V-shaped surface whereby said end portions are clamped in two-point contact against said substantially flat surfaces of said inner V-shaped surface by said respective wedges; and

a respective rigid bar-shaped wedge guide member extending through each of said pairs of aligned wedge bores, each said wedge guide member bearing against a surface of a respective said wedge at a location thereon that is spaced from the location on said wedge at which said wedge contacts said respective end portion of a said reinforcing rod, said respective wedge guide members for guiding said wedges through said pairs of aligned wedge bores respectively.

4,695,179

FASTENING ARRANGEMENT FOR A MINIMUM OF THREE STRUTS ALONG THE SPATIAL AXES

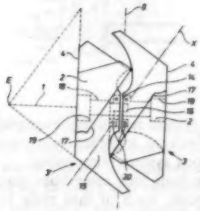
Raimund Schnell, Hans-Saxer-Str. 9, Eichberg SG, Switzerland 9451

Filed Nov. 26, 1985, Ser. No. 801,851

Claims priority, application Switzerland, Nov. 28, 1984, 05672/84

Int. Cl.⁴ F16D *1/00*

U.S. Cl. 403—24 **15 Claims**



1. A retainer for use in a fastening arrangement for a minimum of three struts along the spatial axes, comprising:

a body having a shape, regardless of how formed, which is that shape which would result from cutting a three-sided pyramid-shaped corner from a cube-like body, cutting a second joint face parallel to the face made by the base of the cut-away pyramid at a distance therefrom, and drilling boreholes through the remaining body parallel to the edges of the original cube-like body.

4,695,180

LINK COUPLING DEVICE

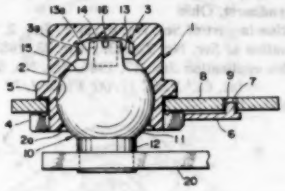
Yasuziro Saito, Fujisawa, Japan, assignor to Jidosha Denki Kogyo Kabushiki Kaisha, Japan

Filed Jun. 24, 1986, Ser. No. 877,933

Claims priority, application Japan, Jun. 28, 1985, 60-99194[U]

Int. Cl.⁴ F16C *11/06*

U.S. Cl. 403—114 **3 Claims**



1. A link coupling device comprising:

a ball pin of a metallic material, said ball pin having a cylindrical fixing part, and a spherical part contiguous with said fixing part, a movement restricting projection portion contiguous with said spherical part and opposite said fixing part, said projection portion having an outer peripheral wall of a tapered cylindrical shape and a cylindrical recess therein with an oil groove being provided at an upper end of said projection portion;

a motor link arm fixed to said ball pin;

a one-piece ball retainer of a synthetic resin having a spherical recess therein and a movement restricting cylindrical recess in the bottom of the spherical recess, said ball retainer being forced over the ball pin with said cylindrical recess of the ball retainer receiving said projection portion of the ball pin and said spherical recess of the ball retainer receiving said spherical part of the ball pin; and

a link connecting rod attached to said ball retainer, whereby said motor link arm and said link connecting rod are connected through said ball pin and ball retainer for limited movement relative to each other.

4,695,181

BALL JOINT

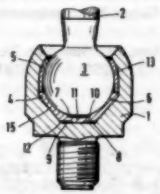
Karl-Heinz Rahmede, Düsseldorf, and Horst-Heinz Stemmer, Meerbusch, both of Fed. Rep. of Germany, assignors to TRW Ehrenreich GmbH & Co. KG, Fed. Rep. of Germany

Filed Aug. 26, 1986, Ser. No. 900,386

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1985, 3530633

Int. Cl.⁴ F16C *11/00*

U.S. Cl. 403—135 **12 Claims**



1. A ball joint comprising:

a housing having a surface defining a chamber;

a ball stud having a shank portion extending outwardly from said housing and a ball end portion disposed in said chamber; and

a resiliently deformable bearing member disposed between said housing and said ball end portion;

said housing having a plurality of elevations thereon, each of

said elevations having radially extending side surfaces defining a plurality of recesses therebetween, and said resiliently deformable bearing member being preloaded and having portions deformed into said recesses to limit rotation of the bearing member relative to the housing.

4,695,182

BALL JOINT WITH MECHANICAL INTERLOCK

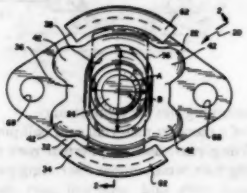
Ruey E. Wood, Jr., St. Clair Shores, Mich., assignor to TRW Inc., Lyndhurst, Ohio

Continuation-in-part of Ser. No. 815,675, Jan. 2, 1986, which is a continuation of Ser. No. 726,135, Apr. 23, 1985, abandoned.

This application Jun. 17, 1986, Ser. No. 875,673

Int. Cl.[4] F16C *11/00*; F16D *1/12*

U.S. Cl. 403—140 **15 Claims**



1. A ball and socket joint for connecting load transmitting members for relative pivotal movement, said ball and socket joint comprising:

a socket for connection with one member, said socket having a surface defining a chamber and an elongate opening;

a ball stud for connection with the other member, said ball stud having a ball portion and a shank portion extending therefrom, said ball portion disposed in said chamber and said shank portion extending through said elongate opening, said shank portion being movable in a path along the longitudinal axis of the elongate opening in said socket;

a resiliently deformable elastomeric layer bonded to said ball portion and resiliently interconnecting said ball stud with said socket for urging said ball stud to an inititial position relative to said socket;

said elastomeric layer having portions which project into volumes defined by said socket to mechanically interlock said elastomeric layer and said socket and to prevent slipping of said elastomeric layer relative to said socket; and

said volumes defined by said socket comprising only volumes transversely spaced from the path of movement of said shank along the longitudinal axis.

4,695,183

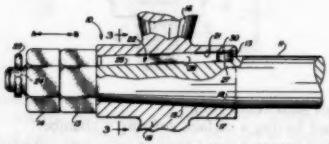
MARINE PROPELLER SHAFT/KEY ASSEMBLY

Robert Greenberg, Cocoa, Fla., assignor to Ray Industries, Inc., Knoxville, Tenn.

Filed Aug. 15, 1986, Ser. No. 896,716

Int. Cl.[4] B25G *3/28*; F16B *3/00*

U.S. Cl. 403—356 **1 Claim**



1. In a marine propeller shaft/key assembly, said assembly including

a shaft for use in driving a propeller, said shaft having

an aft end portion threaded to accept propeller retaining nut means, and

a tapered portion adjacent said aft end portion,

a propeller having a tapered interior hub portion which is matable with the tapered portion of said shaft,

an axial keyway in each of said tapered portions,

said hub portion being retained on said shaft by locking nut means on said threaded aft end portion,

the improved assembly comprising:

(a) axial keyway means in said tapered portion of said shaft, including

(i) an axially extending floor,

(ii) axially extending side wall surfaces, and

(iii) an end wall perpendicular to said floor at the forward end of said keyway, said perpendicular end wall being part of an enlarged rounded extension of said side wall surfaces; and

(b) key means shaped and dimensioned to be slidably received in said axial keyways when said keyways are in angular registration, the forward end of said key being curved to matingly engage the rounded end wall of said shaft keyway, said end wall of said shaft keyway forming a stop which precludes axial movement of said key forwardly in said keyway.

4,695,184

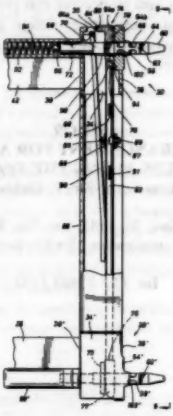
LOCKS FOR CONSTRUCTION COMPONENTS

Alces P. Robishaw, 9333 Memorial, #210, Houston, Tex. 77024, and Paul A. Robishaw, 10122 Meadow Lake La., Houston, Tex. 77042

Filed Aug. 17, 1984, Ser. No. 642,182

Int. Cl.[4] F16B *1/04*

U.S. Cl. 403—410 **30 Claims**



1. A male lock system selectively engageable with a female lock system for locking together two construction components, said male lock system comprising:

a pair of tandem male lock assemblies spaced apart in a first directional mode, each of said male lock assemblies including:

a body comprising socket means having front and rear faces and defining a socket opening extending therethrough in a front-rear directional mode which is transverse to said first directional mode,

a rigid pin member having first and second lock engagement regions spaced from each other along the length of said pin member, said pin member being received in said socket opening for reciprocation relative to said socket means between an advanced position and a retracted position,

lock means carried by said body and mounted for reciproca-

tion with respect to said socket means in said first directional mode between a locking position for interengagement between said pin member and said body and a release position spaced therefrom, and

resilient biasing means cooperative between said body and said pin member to yieldably bias said pin member in the rear-to-front direction;

wherein, when said pin member is in its advanced position, said first lock engagement region is disposed forward of said front face of said socket means, and said second lock engagement region is positioned for engagement by said lock means, and said lock means, in its locking position, is cooperative between said pin member and said body to transfer rear-to-front forces exerted on said pin member to said body;

and wherein, when each of said pin members is in its retracted position, its first lock engagement region is positioned for engagement by the respective lock means, and said lock means, in its locking position, is cooperative between said pin member and said body to prevent forward movement of said pin member to its advanced position;

said pin members of said two lock assemblies being parallel;

body extension means rigidly connecting the bodies of said two lock assemblies in such spaced apart relation;

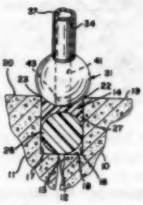
and lock extension means connecting the lock means of said two lock assemblies for joint movement between their locking and release positions.

4,695,185

SEALANT APPLICATOR

Sherwood Spells; James R. Warren, both of Midland, and Ronald W. Wieck, Bay City, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 5, 1985, Ser. No. 708,601
Int. Cl.[4] E01C *23/02, 23/09*
U.S. Cl. 404—107 **4 Claims**



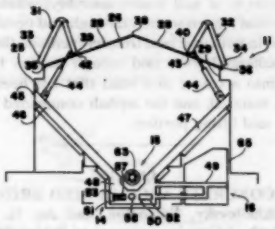
1. An applicator for placing and shaping a sealant into a groove to be sealed, comprising a member having a lower side having a convex arcuate shape for shaping said sealant, a sealant passage extending through said member and including an outlet opening in said lower side wherein no portion of said outlet opening projects beyond said arcuate lower side, said lower side of said applicator having a width substantially greater than the width of said groove to generally remain in contact with the edges thereof and a limiter attached to said member, said limiter extending laterally of said lower side of said member, whereby a portion of said arcuate surface of said lower side extends into said groove during use for shaping the upper surface of said sealant to a generally concave shape at the same time that said sealant is placed into said groove through said outlet opening.

4,695,186

ASPHALT HANDLING APPARATUS

Timothy W. King, Box 1234, Billings, Mont. 59103

Filed Sep. 26, 1986, Ser. No. 912,385
Int. Cl.[4] E01C *19/12*
U.S. Cl. 404—111 **19 Claims**



1. Asphalt handling apparatus including a carriage portion, a hopper portion, a hopper heating portion, as asphalt dispensing portion, a liquid tack material dispensing portion and as equipment lifting portion; said carriage portion including a frame section, an axle member extending transversely of said frame section, a wheel rotatably carried at each end of said axle member; said hopper portion including an elongated trough section with a generally V-shaped cross section, said trough section including transverse end sections with peaked upper edges, said trough section including a generally rectangular open top section, a pair of bi-fold doors selectively covering said open top section, one edge of each of said bi-fold doors being pivotally connected to a longitudinal edge of said trough section adjacent said open top section, said bi-fold doors in a flat configuration contacting one another along a horizontal longitudinal centerline of said trough section located a significant distance above said longitudinal edges of said trough section, free corners of contacting edges of said bi-fold door moving from an open to a closed position closely adjacent to upper edges of transverse end sections of said trough section; said hopper heating portion including an enclosed first chamber disposed immediately below said V-shaped trough section and in direct contact therewith, said first chamber including sloping wing sections having relatively thin substantially uniform cross sections and a deeper central section along the lowest point of said trough section communicating therewith, a heat transfer medium disposed within said first chamber, a U-shaped burner channel disposed substantially horizontally within said central section of said first chamber along the length thereof; a gas burner disposed along the length of a first arm of said U-shaped burner channel, an exhaust stack extending upwardly from a free end of a second arm of said channel, a gas reservoir supplying said burner, an elongated electrical heating element disposed within said central section between said arms of said U-shaped burner channel, controls operating said burner and said heating element; said asphalt dispensing portion including a screw conveyor disposed within said trough section along the lowest point thereof, drive means for said conveyor; said liquid tack material dispensing portion including an elongated second chamber located outside said hopper portion alongside said central section of said hopper heating portion and under one sloping wing section thereof, said second chamber including tubing therein communicating with said central section of said hopper heating portion, valve means communicating with an outlet of said second chamber, delivery means including a nozzle and a length of flexible hose connected to said valve means, a cleaning fluid reservoir communicating with said valve means; said equipment lifting portion including a frame assembly disposed in a generally vertical plane and affixed adjacent a rear transverse trough section on the side of the discharge of said conveyor remote from said liquid tack material dispensing portion, said frame assembly

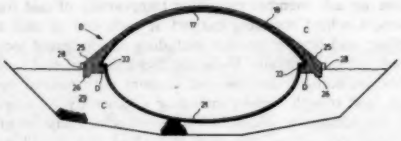
including a fixed section and a vertically movable section slidably engageable therewith, said movable section including an equipment engaging member, a vertically oriented fluid piston/cylinder combination having one end secured to an end of said fixed section and extending therealong, an opposite end of said piston/cylinder combination being secured to said movable section of said frame assembly; whereby asphalt is supplied to said trough section through said open bi-fold doors, heated therein with said heat transfer medium, the resulting hot asphalt discharged from said trough section by said screw conveyor into a cavity in a road that has been coated with liquid tack material, and the asphalt compacted by equipment carried by said lifting portion.

4,695,187

CONCRETE ARCH BURIED BRIDGE

Leonid Mikhailovsky, Edmonton, and Jay G. Ramotar, St. Albert, both of Canada, assignors to Bridginfill Design Ltd., Edmonton, Canada

Filed Jul. 29, 1985, Ser. No. 759,952
Claims priority, application Canada, Aug. 2, 1984, 460229
Int. Cl.[4] E21D *9/00, 11/14;* **E01F** *5/00*
U.S. Cl. 405—124 **13 Claims**



1. A concrete arch buried bridge, comprising,

a lower curved corrugated metal part resting on a compacted fill and having upper longitudinal margins,

an upper arched corrugated metal part having lower longitudinal margins near said upper longitudinal margins and provided with a reinforced concrete cap having a footing at each side thereof,

connecting means, connecting said upper and lower longitudinal margins to provide a conduit, to retain said upper arched corrugated metal part and said lower curved conrrugated metal part against relative horizontal movement while permitting limited relative vertical movement, said connecting means being tightenable to hold said upper and lower longitudinal margins against relative movement.

4,695,188

LINED ROCK CISTERN OR TUNNEL

Jorma Pulkkinen, Porvoo, Finland, assignor to Neste Oy, Finland

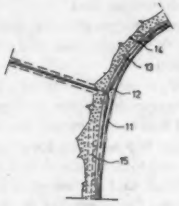
PCT No. PCT/FI85/00024, § 371 Date Oct. 21, 1985, § 102(e) Date Oct. 21, 1985, PCT Pub. No. WO85/04214, PCT Pub. Date Sep. 26, 1985
PCT Filed Mar. 8, 1985, Ser. No. 795,342
Claims priority, application Finland, Mar. 13, 1984, 841016
Int. Cl.[4] E21D *11/00*
U.S. Cl. 405—150 **9 Claims**

1. A rock cistern or tunnel, comprising

an inner layer of tightly sealing material, said inner layer having an inner surface facing the cistern or tunnel, and an outer surface, wherein said tightly sealing material is one of plastic, steel, or concrete fiber,

an intermediate layer formed on said outer surface of said inner layer, said intermediate layer comprising a steel-reinforced, water-tight, sprayed concrete and said intermediate layer having an outer surface,

an outer layer formed on said outer surface of said intermediate layer, said outer layer comprising water-permeable, sprayed concrete and serving as a layer for conducting ground water, wherein said water-permeable, sprayed concrete comprises a light-weight concrete mix of hay-



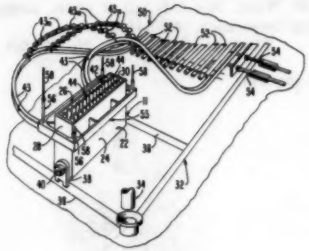
dite, sand, cement, a swelling agent, or a water-conducting fiber.

4,695,189

ROTATING CONNECTION ASSEMBLY FOR SUBSEA PIPE CONNECTION

Norman R. Wallace, Walnut Creek, Calif., assignor to Bechtel International Corporation, San Francisco, Calif.

Filed Apr. 18, 1986, Ser. No. 853,804
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—169 **21 Claims**



1. A connection assembly for interconnecting a subsea well with a platform floating on the surface of the sea comprising:

a connection box;

means coupled with the connection box for pivotally mounting the same on the sea bed for movement from a first position to a second position, said connector box having a flexible pipe segment coupled thereto and being structurally deformable as the connection box moves between said first and second positions, said pipe segment having an inlet end and an outlet end, said inlet end adapted to be coupled to a subsea well to direct flowable hydrocarbons from the well to the outlet end of the pipe segment, there being fitting means on the outlet end of the pipe segment for attachment of the lower end of a fluid conductor extending between the connections box and the vessel, the connection box being pivotal from the first position to the second positions as the length of the fluid conductor to form a J-shaped riser extending between the vessel and the connection box.

4,695,190

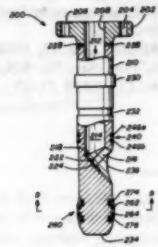
PRESSURE-BALANCED STAB CONNECTION

Michael J. A. Best, Dursley; Richard H. Jones, Stroud, both of England; Joseph H. Hynes, Houston, Tex.; Richard J. Pond, Nailsworth, and Colin R. Gordon, Stroud, both of England, assignors to Smith International, Inc., Newport Beach, Calif.

Filed Mar. 4, 1986, Ser. No. 836,009

Int. Cl.⁴ E21B *33/038, 34/04*

U.S. Cl. 405—169 **25 Claims**



1. Apparatus for sealingly connecting a flow bore of a wellhead to a flowline, comprising:

a stab member including a stab body, said stab body having a stab body bore therethrough, one end of said stab body bore exiting from said stab body and being in fluid communication with the flow bore and the other end of said stab body bore exiting from a side of said stab body through a stab body side port;

a stab receptacle mounted on the wellhead and having a stab receiving bore therethrough for receiving said stab body therewithin;

said stab receptacle having a receptacle flow bore therethrough, one end of said receptacle flow bore being in fluid communication with said stab receiving bore and the other end of said receptacle flow bore exiting said stab receptacle and being in fluid communication with the flowline;

means for establishing fluid communication between said stab body side port and said one end of said receptacle flow bore when said stab body is received within said stab receiving bore, including means disposed on said stab member for orienting said stab member with respect to said Christmas tree for ensuring the alignment of said stab body side port with said one end of said receptacle flow bore when said stab body is received within said stab receiving bore; and

first and second sealing means disposed on said stab body above and below said stab body side port, respectively, for sealing engagement with the walls of said stab receiving bore above and below said one end of said receptacle flow bore for establishing a non-blow-apart, fluid pressure sealed flow passage between said stab body bore of said stab member and said receptacle flow bore of said stab receptacle when said stab body is landed within said stab receiving bore.

4,695,191

HANDLING SYSTEM FOR EFFECTING A SUBMERGED COUPLING

William L. Wagstaff, Tarves, Scotland, assignor to The Floating Technology Company Limited, Greenford, England

Filed Aug. 5, 1985, Ser. No. 762,302

Claims priority, application United Kingdom, Apr. 15, 1985, 8509630

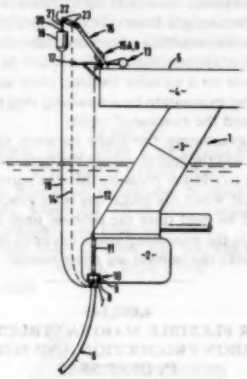
Int. Cl.⁴ E02D *21/00*

U.S. Cl. 405—195 **5 Claims**

1. A method of coupling the free end of a riser extending from a sea bed location to a submerged portion of a floating structure provided with a riser handling system of the type including a first coupling part attached to the free end of the riser, a second coupling part for selective releasable connection to the first coupling part, a third coupling part attached to a submerged portion of the floating structure, and control means on the floating structure for moving the second coupling part, comprising the steps:

recovering the free end of the riser and positioning it at an above-water location on said floating structure;

operating the control means to move the second coupling part to said above-water location;



coupling said second coupling part to the first coupling part at said above-water location;

operating said control means to move the second coupling part with said first coupling part and hence the riser attached thereto from said above-water location to an underwater location on the floating structure; and,

utilising said control means to couple the second coupling part to the third coupling part at said underwater location thereby effecting coupling of said riser to said floating structure.

4,695,192

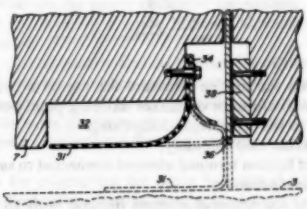
FLAPPER-TYPE SEALING SYSTEM FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

Richard New, Kenmore, N.Y., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 3, 1986, Ser. No. 835,420

Int. Cl.⁴ E02B *17/00;* **E02D** *23/16*

U.S. Cl. 405—203 **7 Claims**



1. A sealing apparatus to affix a gravity founded, movable offshore structure onto a subbase that rests on the sea floor, during the time when the movable structure is being deballasted to prepare for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing member to support the platform, the member is fixedly connected to the platform, and extends in a generally downward direction;

a generally flat surface on the underside of the member;

a subbase located on the sea floor to provide support to the platform;

a generally flat upper surface on the subbase to support the member on the upper surface of the subbase;

means for creating a space between the subbase and the member;

a reinforced, elastomeric flapper-type seal fixed in a closed loop on the bottom surface of the at least one member for sealing purposes, the seal being engaged once a portion of the platform weight forces the elastomeric seal down onto the subbase to establish a barrier around the space the seal mounted at approximately 90° relative to the surface of the subbase on a metallic backing plate and kept in position during evacuation by a retaining ring placed between the seal and the evacuated space;

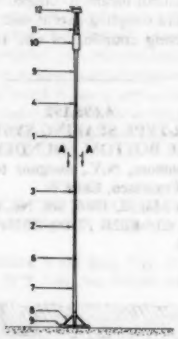
means for evacuating the space between the subbase, the member, and the seal to reduce the hydrostatic pressure in the space to a lower pressure than the surrounding seawater, so that when the space has been evacuated, the platform will be held onto the subbase until the hydrostatic pressure in the evacuated space has been restored to equilibrium with the outside sea environment.

4,695,193

SLENDER FLEXIBLE MARINA STRUCTURE FOR HYDROCARBON PRODUCTION AND SHIP MOORING IN DEEP SEAS

Gaetano Sebastiani, Mestre; Roberto Brandi; Francesco Di Lena, both of Padua; Silvestro Vanore, Mestre, and Roberto Carraro, Padua, all of Italy, assignors to Tecnomare S.p.A., Venice, Italy

Filed Apr. 30, 1984, Ser. No. 605,164
Claims priority, application Italy, May 9, 1983, 84116 A/83
Int. Cl.[4] E02B *17/00*
U.S. Cl. 405—204 **9 Claims**



1. A deep sea marine structure for use as a hydrocarbon production platform or oil tanker mooring point positioned in proximity to the sea surface comprising:

a foundation base assembly,

a tapered bottom terminal element connected to said foundation base assembly,

a tapered top terminal element integral with an immersed buoyancy chamber which is located in proximity to the sea surface,

said bottom terminal element and said top terminal element being connected by a vertical tubular element,

said vertical tubular element is maintained under tension by said immersed buoyancy chamber,

a structure supported by said immersed buoyancy chamber located above the surface of the sea,

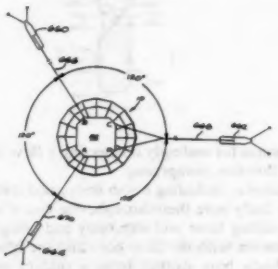
the rigidity of said bottom terminal element decreases in the up direction and the rigidity of said top terminal element decreases in the down direction.

4,695,194

MOBILE MARINE OPERATIONS STRUCTURE

Arun Bhalaik, Seattle, Wash.; Peter W. Braddick, Fullerton, Calif.; Darryl S. Brittin, Laguna Hills, Calif., and Gerald L. Johnson, Orange, Calif., assignors to Santa Fe International Corporation, Alhambra, Calif.

Division of Ser. No. 819,288, Jan. 16, 1986. This application Dec. 23, 1986, Ser. No. 945,514
Int. Cl.[4] E02B *17/00*
U.S. Cl. 405—207 **10 Claims**



1. The process of installing a marine operations structure in a pre-determined sea floor location, said structure having a central core and a support base having at least two differently sloped ice wall surfaces for achieving fracturing of ice features, and having at least two series of circumferentially arranged ballast tanks, comprising the steps of:

positioning the structure over a selected sea floor location by the use of at least three tug boats connected to said structure by tension cables arranged radially with respect to said structure;

flooding a first series of lower ballast tanks in a sequential ballasting operation;

flooding a second series of ballast tanks located at a higher elevation within said structure than said first series of ballast tanks;

maintaining radial forces along said tension cables during said flooding steps; and

after said structure has become founded on the bottom of the sea, pumping sea water into fluid tanks some of which are located at an elevation above the water level.

4,695,195

FOLDING BOAT DOCK

Bruce R. Brande, 3214 Lettie, Ames, Iowa 50010

Filed Mar. 5, 1986, Ser. No. 836,327
Int. Cl.[4] B63C *1/00*
U.S. Cl. 405—220 **36 Claims**

1. A boat dock assembly for retrievable extension into a body of water from the shore, comprising:

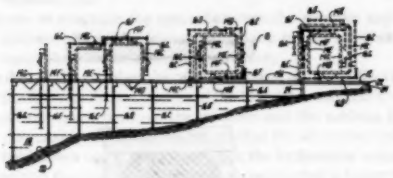
a base secured to the shore;

a plurality of elongated dock sections, including a first and last dock section, each having opposite forward and rearward ends and opposite sides,

a plurality of hinge means for pivotally securing said dock sections together in an end-to-end relation, with said rearward end of said first dock section being pivotally secured to said base by one of said hinge means, each of said hinge means having a pivot axis transverse to the longitudinal axis of said dock sections,

a plurality of support means attached to each dock section for supporting said dock sections above the surface of the body of water; and

means for rolling said dock sections out of said body of water by sequentially pivoting each dock section in one direction above the respective hinge means, commencing with said last dock section, such that said dock sections roll into a spiral configuration adjacent said base, and for



unrolling said dock sections from said spiral configuration into said body of water by sequentially pivoting each dock section in the opposite direction about the respective hinge means, commencing with said first dock section;

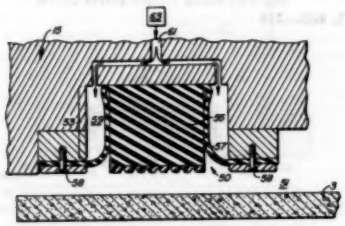
said means for rolling and unrolling said dock sections including a series of rail members operatively connected to said dock sections and means for extending and retracting said rail members such that said dock sections roll and unroll, respectively.

4,695,196

PAD-TYPE INFLATABLE SEAL FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

Richard New, Kenmore, N.Y., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 3, 1986, Ser. No. 835,419
Int. Cl.[4] E02B *17/00*; E02D *5/74*
U.S. Cl. 405—224 **1 Claim**



1. A sealing apparatus for affixing a gravity founded, movable offshore structure onto a sub-base that rests on the sea floor, during the time when the movable structure is being deballasted in preparation for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing member for supporting the platform, the member being fixedly connected to the platform and extending in a generally downward direction from the platform, the underside of the member having a generally flat surface;

a subbase also for providing support to the platform, the subbase having a generally flat surface so that the member may rest on the upper surface of the subbase;

a recessed chamber within the member;

a flexible elastomeric seal attached to both sides of the recessed chamber to seal the recessed chamber off from the outside sea environment and make it fluid-tight;

a pad attached to the outside of the elastormeric seal, the pad arranged to undergo mechanical compression when properly mating the subbase;

a manifold line connected to the fluid-tight recessed chamber;

means for creating an internal pressure within the recessed chamber through the manifold line;

means for creating a space between the member and the subbase; and

means for evacuating the space between the member and the subbase to reduce the hydrostatic pressure within the space to a point lower than the surrounding seawater;

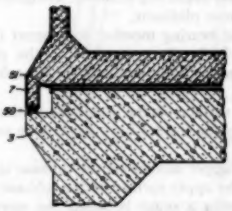
so that when the recessed chamber is pressurized the flexible seal will create a fluid-tight seal against the sub-base so that the hydrostatic pressure in the space may be reduced to keep the platform on the subbase until such time as the pressure in the space is equalized with the surrounding seawater.

4,695,197

ELASTOMERIC SEAL FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

Brian J. Watt, Kingwood; Dilipkumar N. Bhula, Houston, and Jal N. Birdy, Kingwood, all of Tex., assignors to Chevron Research Company, San Francisco, Calif.

Filed Mar. 13, 1986, Ser. No. 839,492
Int. Cl.[4] E02B *17/02*
U.S. Cl. 405—224 **4 Claims**



1. A sealing apparatus to affix a gravity founded, movable offshore structure onto a subbase that rests on the sea floor, during the time when the movable structure is being deballasted to prepare for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing member to support the platform, the member is fixedly connected to the platform and extending in a generally downward direction from the platform;

a generally flat surface on the underside of the member;

a subbase also located on the sea floor to provide support to the platform;

a generally flat upper surface on the subbase to support the member on the upper surface of the subbase;

means for creating a space between the subbase and the member;

a passive, elastomeric seal on the bottom of the at least one load bearing member and mounted on a lip for sealing purposes, the seal being engaged once a portion of the platform weight forces the elastomeric seal down onto the subbase to establish a fluid-tight barrier around the space; and

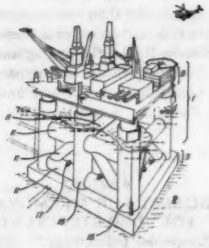
means for evacuating the space between the subbase, the member and the elastomeric seal to reduce the hydrostatic pressure to a lower pressure than the surrounding seawater, so that when the space has been evacuated the platform remains on the subbase while it is being deballasted until such time when the hydrostatic pressure in the evacuated space has been restored to equilibrium with the outside sea environment.

4,695,198

LIP-TYPE SEALING SYSTEM FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

John H. Goodacre, Glen Ellyn, and Eric Brogren, Wheaton, both of Ill., assignors to Chevron Research Company, San Francisco, Calif.

Filed May 23, 1986, Ser. No. 866,825
Int. Cl.[4] E02B *17/02*
U.S. Cl. 405—224 **8 Claims**



1. A sealing apparatus to affix a gravity founded, movable offshore structure onto a subbase that rests on the sea floor, during the time when the movable structure is being deballasted to prepare for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing member to support the platform, the member is fixedly connected to the platform and extends in a generally downward direction from the platform;

a generally flat surface on the underside of the member;

a subbase located on the sea floor to provide support to the platform;

a generally flat upper surface on the subbase to support the member on the upper surface of the subbase;

means for creating a space between the subbase and the member;

a reinforced, elastomeric lip seal membrane fixedly connected to the bottom of at least one support member in a closed loop for primary sealing purposes, the membrane being able to contact the subbase once a portion of the platform weight forces the membrane down onto the subbase; and

means to evacuate the space between the lip seal, the subbase, and the pontoon, to reduce the hydrostatic pressure lower than the surrounding seawater so that when the space has been evacuated the platform is held onto the subbase until the hydrostatic pressure in the evacuated space is restored to equilibrium with the outside sea environment.

4,695,199

ELASTOMERIC BEARING PAD AND SEAL FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

John H. Goodacre, Glen Ellyn, Ill., and Larry J. Hall, Birmingham, Ala., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 2, 1986, Ser. No. 869,524
Int. Cl.[4] E02B *17/00*; E02D *5/74*
U.S. Cl. 405—224 **2 Claims**

1. A sealing apparatus to hold a gravity founded, movable offshore structure onto a subbase during deballasting of that structure, comprising:

a movable offshore platform;

means for ballasting and deballasting said platform;

a plurality of load bearing columns fixedly connected to said platform in a generally downward direction;

a pontoon fixedly connected to the lower surface of said columns;

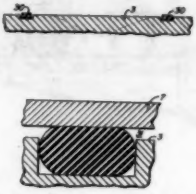
a generally flat lower surface on the underside of said pontoon;

a subbase located on the sea floor to support the pontoon;

a generally flat upper surface of said subbase;

a circular channel in the subbase arranged in a closed loop;

an elastomeric bearing pad, having a specific gravity greater than seawater, placed in the circular channel, the elastomeric bearing pad extending out of the channel so that when the pontoon compresses the elastomeric bearing pad, a fluid-tight space is created between the subbase, the pontoon and the elastomeric bearing pad;



space bars to hold the elastomeric bearing pad substantially in the center of the channel; and

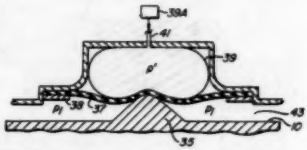
means to evacuate the water from the space.

4,695,200

MEMBRANE SEAL FOR A REMOVABLE BOTTOM FOUNDED STRUCTURE

Larry Hall, Birmingham, Ala., and John H. Goodacre, Glen Ellyn, Ill., assignors to Chevron Research Company, San Francisco, Calif.

Filed Jun. 2, 1986, Ser. No. 869,525
Int. Cl.[4] E02B *17/00*; E02D *21/00*
U.S. Cl. 405—224 **2 Claims**



1. A sealing apparatus to affix a gravity founded, movable offshore structure onto a subbase that rests on the sea floor, during the time when the movable structure is being deballasted to prepare for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing member to support the platform, the member is fixedly connected to the platform and extending in a generally downward direction from the platform;

a generally flat surface on the underside of the member;

a subbase to provide support to the platform;

a generally flat upper surface on the subbase to support the at least one member on the upper surface of the subbase;

a raised sill located on the upper surface of the subbase on which the columns will sit, the sill being arranged in a substantially circular closed loop;

an indented portion in the member, corresponding to the sill configuration so that both the sill and the indented portion will match each other when the member is placed on the subbase;

a flexible seal attached to the sides of the indented portion so that there is a fluid-tight inside chamber in the indented portion;

an inflatable bladder within the fluid-tight inside chamber of the indented portion;

means to inflate the bladder;

means to support substantially all of the platform weight;

means to establish a space between the subbase and the member; and

means to evacuate the space between the member and the subbase to create a lower hydrostatic pressure within the space than the surrounding seawater;

so that as the member sits on the subbase, the sill deflects the flexible membrane, and once the bladder is inflated it seals off the space between the member and the subbase from the outside sea environment, so that the structure will be held down onto the subbase once the hydrostatic pressure within the space is reduced to a pressure that is lower than the surrounding seawater.

4,695,201

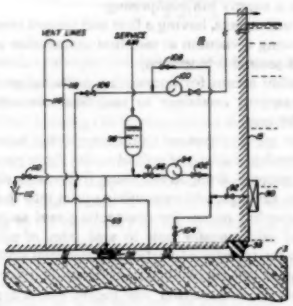
REMOVABLE BOTTOM FOUNDED STRUCTURE

Robert H. Beskow, Concord; Patrick J. Dunn, Pleasant Hill, both of Calif.; John H. Goodacre, Glen Elly, Ill.; Larry J. Hall, Birmingham, Ala.; William H. Fischer, Wingdale, N.Y., and E. Ronald Carlson, New Fairfield, Conn., assignors to Chevron Research Company, San Francisco, Calif.

Filed Aug. 21, 1986, Ser. No. 898,989

Int. Cl.[4] F02B *17/02*

U.S. Cl. 405—224 **11 Claims**



1. A sealing apparatus to affix a normally gravity founded, movable offshore structure onto a subbase that rests on the sea floor, during the time when the movable structure is deballasted to prepare for rapid site removal, comprising:

a movable offshore platform;

at least one load bearing column to support the platform, the column is fixedly connected to the platform and extends in a generally downward direction from the platform;

a generally flat lower surface on the at least one column;

a subbase located on the sea floor to support the platform;

a generally flat upper surface on the subbase to support the at least one column on the upper surface of the subbase;

means to create a space between the subbase and the at least one column;

a passive, elastomeric seal arranged in a closed loop in the space between the underside of the at least one column and the subbase for primary sealing purposes, the seal is engaged once a portion of the platform weight compresses the elastomeric seal down onto the subbase to establish a fluid-tight barrier around the space;

an inflatable seal affixed in a closed loop to the underside of the at least one column for secondary sealing purposes once the inflatable seal is inflated and pressed against the subbase and the at least one column to establish a fluid-tight barrier in the space;

means to inflate the inflatable seal; and

means to evacuate the space to reduce the hydrostatic pressure lower than the surrounding seawater pressure so that when the space is evacuated the platform will be held onto the subbase while it is devallasted until such time when the hydrostatic pressure in the evacuated space has been restored to equilibrium with the outside sea environment.

4,695,202

SYSTEM OF SUBMARINE LINKING BETWEEN THE LEGS OF A PLATFORM AND THE RELATING FOUNDATION PILES

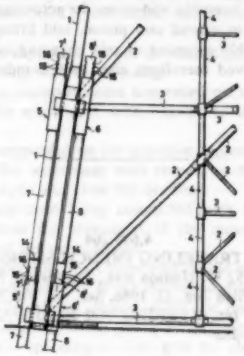
Gian P. Ferrari Aggradi, Barberino di Mugello, and Cesare M. Ferrante, Florence, both of Italy, assignors to Nuovo Pignone S.p.A., Florence, Italy

Filed May 2, 1986, Ser. No. 859,008

Claims priority, application Italy, May 3, 1985, 20570 A/85

Int. Cl.[4] E02B *17/00*

U.S. Cl. 405—227 **3 Claims**



1. A system for submarine linking between anchoring cylinders affixed to a platform leg and a related foundation pile, characterized in that said anchoring cylinders are composed of two coaxial cylinders, one of which is an outer cylinder having a substantial thickness of high yield strength steel, the other of which is an inner cylinder having a thickness of low yield strength steel, said thickness being less than the thickness of said outer cylinder, wherein said outer cylinder and said inner cylinder are butt-welded to each other at their ends so as to define an annular chamber between said cylinders, said chamber being radially inwardly expansible by the application of pressure therein, and wherein said related foundation pile is composed of high yield strength steel in a zone where said submarine linking is to be accomplished said zone of said pile including an outer surface with alternating slots and toothing and an inner thickened surface.

4,695,203

METHOD AND APPARATUS FOR SHORING AND SUPPORTING A BUILDING FOUNDATION

Steven D. Gregory, Ada, Okla., assignor to Gregory Enterprises, Inc., Ada, Okla.

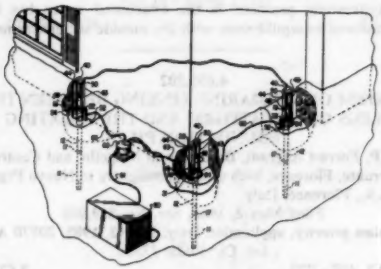
Filed Apr. 11, 1985, Ser. No. 722,060

Int. Cl.[4] E02D *5/00*

U.S. Cl. 405—230 **11 Claims**

1. An apparatus for raising and supporting the foundation or slab of a building, said apparatus comprising means for engaging the lower surface of said foundation or slab, said engaging means including a tubular guide means; a pipe assembly extending through said guide means and having an upper portion

extending above said guide means and a lower portion extending into the ground; a lifting saddle connected to said engaging means and extending around said upper portion of said pipe assembly; hydraulic lifting means extending between said upper portion of said pipe assembly and said lifting saddle, said



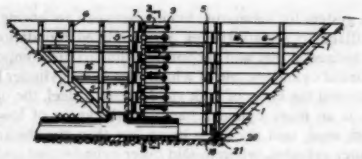
hydraulic lifting means including a piston disposed coaxially with said pipe assembly, and means for actuating said hydraulic lifting means to extend said piston, said lifting saddle being quick-detachably mounted to said engaging means so that it may be removed therefrom after said foundation or slab is raised.

4,695,204

TRAVELING TRENCH SHORE

Noel G. Bell, 52 W. Hudson Ave., Englewood, N.J. 07631

Filed Jun. 12, 1986, Ser. No. 873,709
Int. Cl.[4] E02D *17/00*; E21D *5/12*
U.S. Cl. 405—283 **9 Claims**



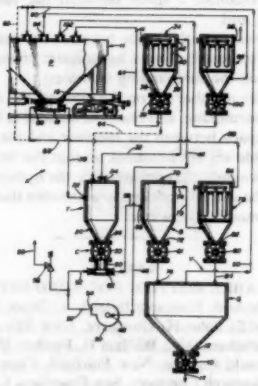
1. A traveling trench shore of the type consisting of longitudinal panels which cover the walls of the trench, the panels being supported transversely against the walls of the trench by vertical soldier beams and cross braces that form movable frames on which hydraulic jacks are mounted that are connected to the panels and move the panels forward, the reaction for the jacks being taken by the frames which are held in position by other jacks attached to other panels, which panels are held stationary by the friction between them and the walls of the trench, the panels being movable vertically and individually in succession and having plates on their lower edges and ends to cover the junction with panels below and behind them and prevent entry of earth between them; the shore comprising: a central chamber where a permanent structure is installed; a front section with walls sloping to conform to the natural slope of the ground, where excavation takes place; and a rear section with similar sloping walls to allow for installing manholes consisting of vertical segments, the vertical soldier beams of the rear section being cantilevered downwards below the lowest cross braces so that the shore can pass over each manhole segment after the segment is placed.

4,695,205

PNEUMATIC CONVEYING SYSTEM

Marc S. Levine, Houston, Tex., assignor to United DC, Houston, Tex.

Filed Dec. 20, 1985, Ser. No. 811,951
Int. Cl.[4] B65G *53/28, 53/60*
U.S. Cl. 406—38 **20 Claims**



1. A closed loop pneumatic conveying system for transferring granular and powdered particulate materials from a transport container having a discharge manifold and a vent opening thereon, to a supply bin comprising:

transfer unit means, having a first and second connection, for generating a vacuum at said first connection and pressure at said second connection;

first conduit means for connecting a discharge manifold on the transport container to said first connection of said transfer unit;

separator means mounted to the supply bin having an inlet, a particulate outlet and a fluid outlet for separating particulate material, from an incoming fluid-particulate material stream, through said particulate outlet into the supply bin;

second conduit means for connecting said second connection of said transfer unit to said inlet of said separator means for transfer of particulate material under pressure;

said transfer unit means further comprising conveying means to separate said transfer unit means into a pressure zone, connected to said second conduit, and a vacuum zone, connected to said first conduit, and to allow particulate materials to flow from said vacuum to said pressure zone;

third conduit means for connecting said fluid outlet of said separator means to the discharge manifold on the transport container thereby closing a loop, said third conduit means being devoid of flow controlling elements therein; and

means for venting the supply bin into the transport container.

18. A method for unloading a transport container into a supply bin comprising the steps of:

connecting a first cyclone separator inlet to a particulate material discharge connection of a transport container;

applying a vacuum to said first cyclone separator to pneumatically convey particulate matter from the discharge connection of the transport container into the first cyclone separator;

discharging particulate matter from the first cyclone separator through a valve into a pressure conveying line;

applying a pressure source to the pressure conveying line to pneumatically convey the particulate material in the pressure conveying line to a second cyclone separator mounted to the supply bin;

discharging particulate material from said second cyclone separator into the supply bin;

conducting fluid and particulate matter emerging from an overhead connection on said second cyclone separator into a conduit connected to said particulate matter discharge connection of the transport container;

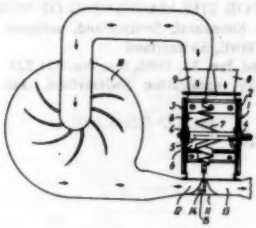
venting the conduit used in said conducting step into a vent connection on the transport container.

4,695,206

PNEUMATIC CONVEYOR FOR PARTICULATE MATERIAL

Jens O. E. Hansen, Fuglebjerg, Denmark, assignor to Kongskilde Koncernselskab A/S, Sord, Denmark

Filed Apr. 14, 1986, Ser. No. 851,217
Claims priority, application Denmark, Apr. 15, 1985, 1697/85
Int. Cl.[4] B65G 53/46
U.S. Cl. 406—65 **2 Claims**



1. A pneumatic conveyor for delivery of low weight particulate material comprising

a cellular rotor including

a cylindrical housing (1) having spaced side wall (2 and 3), bearing means (4) in each side wall (2 and 3),

a horizontal shaft (5) extending between said side walls (2 and 3) and being supported by said bearing means (4),

a plurality of radial vanes (6) carried by said shaft (5) and extending to the periphery of the housing (1), to define a plurality of radial cells,

a filter wall (7) vertically disposed in said housing (1) transversely to said horizontal shaft and separating said housing into an inlet side and an outlet side,

an air inlet (8) on top of said housing communicating with said inlet side for air carrying the particulate material into said inlet side,

an air outlet (9) on top of said housing communicating with said outlet side for carrying air from said outlet side,

a conveyance conduit (11) on the bottom of said housing (1) having at one end an air inlet chamber (12) in open communication with the outlet side of said housing (1) and at an opposite end a discharge chamber (13) in open communication with the inlet side of said housing (1) to receive particulate material therefrom,

a blower 10 having a suction protion communicating with said air outlet (9) to withdraw air from the outlet side of said housing (1) and having a pressure portion communicating with said air inlet chamber (12) to deliver pressurized air thereto,

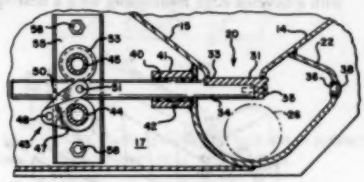
a threshold means (14) located at the plane of the filter wall in said conveyance conduit (11) to narrow an air flow path therebetween whereby part of the pressurized air proceeds from said air inlet chamber (12) upward into the outlet side of said housing (1) and whereby a second part of the pressurized air proceeds directly into said discharge chamber (13) for air carrying and discharging the particulate material dropped thereinto.

4,695,207

PNEUMATIC GATE OPERATOR AND OUTLET CAP

Roy W. Miller, Highland, Ind., assignor to Pullman Rail Leasing Inc., Chicago, Ill.

Filed Jul. 18, 1985, Ser. No. 756,784
Int. Cl.[4] B65G 53/46
U.S. Cl. 406—130 **24 Claims**



11. A pneumatic hopper discharge structure comprising:

a discharge housing including a pair of transversely spaced downward sloping walls forming an opening and a pair of end walls connected to the ends of the downward sloping walls;

a control tube supported below the discharge housing and communicating with the opening;

movable valve support means supported on the discharge structure for movement with respect to the discharge housing;

valve means supported on the movable support means and positioned for movement with respect to the discharge housing to open and close the opening;

a crank arrangement being connected with the movable support means for movement of the movable support means and of the valve means;

a first valve operating shaft supported on the end walls and extending longtudinally of the discharge structure below one of the downward sloping walls, the operating shaft being connected with the crank arrangement providing rotation of the operating shaft to open and close the opening;

the crank arrangement including

a crank member being fixedly mounted on the operating shaft; and

a connector member having two end portions, one end portion having a pivotal connection with the crank member and the other end portion being pivotally connected with the movable support means providing a varying mechanical advantage being greatest during initial movement of the valve means in the opening in opening and closing thereof;

the distance on the crank member from the operating shaft to the pivotal connection being substantially equal to the vertical distance from the operating shaft to the movable support means for efficient load transfer during opening and closing of the valve means.

4,695,208

TOOL HOLDER

Gerald K. Yankoff, 8273 Coppernail Way, Westchester, Ohio 45069

Filed Nov. 14, 1985, Ser. No. 798,122
Int. Cl.[4] B23B 27/10, 27/16, 27/22
U.S. Cl. 407—106 **4 Claims**

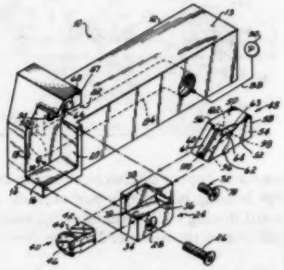
1. A tool holder for machining a workpiece with an insert having a top surface terminating with a cutting edge, comprising:

a support bar formed with a cavity defining a top wall having an outer face, said support bar being formed with a threaded bore terminating in a recessed seat at said outer face in said top wall;

a mounting block formed with a seat having a bottom wall, a side wall and a rear wall;

means for removably securing said mounting block within said cavity of said support bar, said seat of said mounting block receiving an insert so that the top surface of the insert is exposed;

a clamping block disposed within said cavity beneath said top wall of said support bar and atop the exposed, top surface of the insert, said clamping block being formed with a beveled edge terminating with a bearing surface;



a screw having a tapered head matable with said recessed seat in said outer face of said top wall of said support bar and said bearing surface of said clamping block, said screw being inserted into said threaded bore of said support bar so that said tapered head of said screw engages both said recessed seat in said support bar and said bearing surface in said clamping block to force said clamping block against the insert for clamping the insert against said bottom wall, said side wall and said rear wall of said mounting block.

4,695,209

HELICAL GUIDE APPARATUS USABLE FOR A GEAR SHAPER

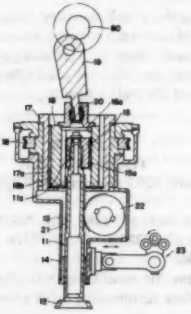
Takayo Noguchi; Yoichi Togawa; Tsuneo Nishimoto; Yoshiharu Tonohara, all of Kyoto; Tadashi Rokkaku, Hiroshima; Seigo Nakai, Kyoto; Michio Araki, Kyoto, and Kahei Kitano, Kyoto, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Filed Jul. 21, 1986, Ser. No. 888,973

Claims priority, application Japan, Aug. 13, 1985, 60-176926; Oct. 21, 1985, 60-233189; Feb. 5, 1986, 61-22151

Int. Cl.[4] B23F *9/04*

U.S. Cl. 409—42 **3 Claims**



1. A helical guide apparatus usable for a gear shaper of the type comprising a main spindle adapted to reciprocably move in an axial direction and rotate in a circumferential direction, first reciprocable driving means for reciprocably driving said main spindle, a male pattern fixedly connected to the main spindle or made integral with the latter, said male pattern being formed with a first helical projection of which lead and direction are determined corresponding to a certain required helix angle, a first female pattern disposed around the male pattern and having a first helical recess on an inner wall surface into which said first helical projection on the male pattern is fitted and a second helical projection on an outer surface thereof of which lead and direction are determined same or opposite to those of the first helical projection, a second female pattern disposed around said first female pattern and having a second helical recess on an inner wall surface thereof into which said second helical projection on said first female pattern is fitted, said second female pattern being rotated in synchronization with a workpiece to be worked, and second reciprocable driving means for reciprocably driving the first female pattern in the axial direction of the main spindle in synchronization with reciprocable movement of the latter.

4,695,210

APPARATUS FOR THE MACHINING OF WORKPIECES

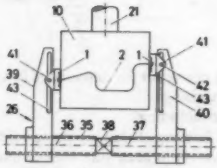
René Büchler, Sonnental, Switzerland, assignor to Büchler G-Set A.G., Flawil, Switzerland

Filed Jan. 22, 1986, Ser. No. 821,233

Claims priority, application Switzerland, Jan. 22, 1985, 279/85

Int. Cl.[4] B23Q *3/06*

U.S. Cl. 409—219 **9 Claims**



1. In an apparatus wherein a workpiece affixed for support at a supporting means of the apparatus is subjected to a machining process for separating said workpiece into a waste piece and a remaining piece, whereby when said machining is completed only said remaining piece is kept affixed for support at the supporting means, the improvement comprising at least one pair of retention means cooperating with each other for retaining said waste piece unmovably positioned with respect to said remaining piece, each retention means comprising attachment means for attaching a first portion of said retention means to said remaining piece for supporting said retention means at said remaining piece and attachment means for attaching a second portion of said retention means to said waste piece for supporting said waste piece at said retention means, wherein when said machining is completed said waste piece and said remaining piece have respective surfaces facing each other and defining between them a machining space, and each said retention means is shaped for bridging said machining space, said retention means comprising substantially the sole support for said workpiece during the machining process.

4,695,211

REFRIGERATED CARRIER FLOOR CLAMP

Willem H. P. Van Iperen, Westfield, N.J.; Henry J. Sandt, Jr., Mt. Bethel, Pa., and Eric G. Aronson, Livingston, N.J., assignors to Sea-Land Corporation, Inc., Elizabeth, N.J.

Filed Sep. 10, 1985, Ser. No. 774,318

Int. Cl.[4] B60P *1/64*

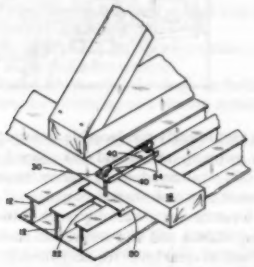
U.S. Cl. 410—77 **10 Claims**

1. A clamping arrangement for clamping to a floor con-

structed from a plurality of parallel arranged T-shaped floor members, comprising:

a. a cargo carrier having a floor constructed from a plurality of parallel arranged T-shaped floor members which are spaced apart at regular intervals along the floor to form a cargo bearing floor formed by the tops of the regularly spaced apart T-shaped floor members, with the top of each T-shaped floor member being supported by a central vertical support member, with the spaces between the regularly spaced apart floor members providing for ventilation to allow air to circulate beneath the cargo;

b. a channel shaped top floor plate positioned across the top of two adjacent T-shaped floor members, said channel shaped top floor plate comprising an elongated member with its length extending parallel to the T-shaped floor members, and having a cross section in the shape of an inverted U with the base of the inverted U extending completely across the tops of the two adjacent T-shaped



floor members, and the legs of the U extending downwardly outside of the T tops of the two adjacent T-shaped floor members;

c. an under floor hold down plate positioned between the two adjacent T-shaped floor members and beneath the T-tops of the T-shaped floor members, said under floor hold down plate including at least one threaded aperture therein;

d. an elongated strap member, having a length substantially equal to the top floor plate, adapted to be positioned on top of a beam placed on top of the top floor plate; and

e. at least one bolt extending through said strap member, alongside the beam, through the channel shaped top floor plate, between the two adjacent T-shaped floor members, and through a said threaded aperture in the under floor hold down plate, and serving to clamp the top floor plate to the under floor hold down plate against the T tops of the T-shaped floor members positioned therebetween.

4,695,212

COMPOSITE CHANNEL AND PLATE NUT ASSEMBLY

Imre Berecz, El Toro, Calif., assignor to Microdot Inc., Darien, Conn.

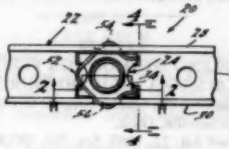
Filed Apr. 25, 1986, Ser. No. 855,712
Int. Cl.[4] F16B *27/00*
U.S. Cl. 411—85 **1 Claim**

1. A composite channel and plate nut assembly comprising

a U-shaped channel defined by a web portion and spaced side flanges,

said channel having a plurality of apertures in the web portion thereof immediately adjacent the flanges therein whereby said flanges define and are contiguous with the laterally outer walls of said apertures, respectively, and

a plate nut having a threaded portion for the acceptance of a complementary bolt and a base flange seated on the web portion of said channel, the base flange of said nut having a plurality of downwardly extending lugs thereon acceptable in the apertures of the web portion of said channel, respectively, the base flange and the lugs on said nut bearing against the side flanges of said channel whereby reaction forces upon threading of a bolt into said nut are accepted directly by said channel flanges; and



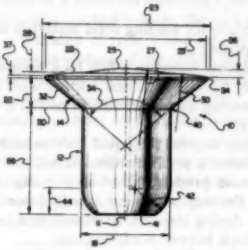
means for retaining the base flange on said nut in juxtaposed relation to the web portion of said channel.

4,695,213

CONTROLLED EXPANSION PROTRUDING-HEAD RIVET DESIGN

Kenneth P. Sparling, Burbank; Angelo Incardona, Reseada; Garth D. Kikendall, Glendale; David G. Richardson, Burbank; Ronald E. Wood, Sepulveda, and Leon Bakow, Sherman Oaks, all of Calif., assignors to Lockheed Corporation, Calabasas, Calif.

Filed Nov. 29, 1984, Ser. No. 676,464
Int. Cl.[4] F16B *19/06*
U.S. Cl. 411—506 **4 Claims**



1. A flush-head rivet, having a shank portion with a minimum and maximum diameter and a nominal diameter therebetween, for joining two or more structural members together, the members having a countersunk rivet hole therethrough with a countersink included angle of between 99 and 101 degrees, the rivet providing controlled expansion of the rivet hole when the hole has a minimum diameter equal to the maximum shank diameter and a maximum diameter of 1.05 times the minimum shank diameter, the rivet comprising:

a head portion comprising:

a head diameter before forming a land on the edge thereof of between 1.875 times the minimum shank diameter and 1.879 times the maximum shank diameter;

a minimum head diameter after forming the land on the edge thereof of 1.823 times the minimum shank diameter;

a land width on said head of between 0.021 times the minimum shank diameter and 0.012 times the maximum shank diameter;

a head major crown radius between 2.974 times the minimum shank diameter and 2.690 times the maximum shank diameter; and

a major crown height of between 0.063 times the minimum shank diameter and 0.078 times the maximum shank diameter; and

a minor crown radius between 4.014 times the minimum

shank diameter and 2.880 times the maximum shank diameter;

a minor crown height of between 0.021 times the minor shank diameter and 0.031 times the maximum shank diameter;

an underhead included angle of 102 to 103 degrees.

4,695,214

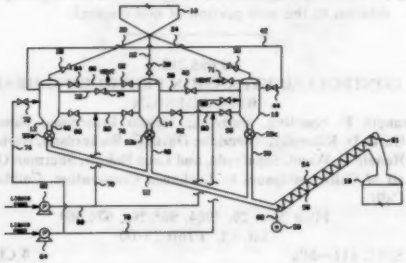
APPARATUS AND METHOD FOR FEEDING SOLID MATERIALS TO A HIGH PRESSURE VESSEL

James Scinta, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 22, 1985, Ser. No. 757,817

Int. Cl.[4] B65G *65/32*

U.S. Cl. 414—221 **12 Claims**



12. A method for feeding solid materials to a high pressure vessel comprising:

(a) introducing liquid to a first lock hopper so as to at least partially fill said first lock hopper with said liquid;

(b) introducing solid materials to said first lock hopper after step (a);

(c) if during step (b) the liquid level in said first lock hopper rises above a predetermined level, the volume of liquid above said predetermined level being denoted as excess liquid, the step of passing at least a portion of said excess liquid, during step (b), from said first lock hopper to another lock hopper is carried out;

(d) supplying a liquid to said first lock hopper after step (c) so as to attain a pressure in said first lock hopper which is substantially equal to the pressure of high pressure vessel; and

(e) discharging said solid materials from said first lock hopper after step (d) so as to be introduced to said high pressure vessel.

4,695,215

DEVICE FOR AUTOMATICALLY TRANSPORTING DISK SHAPED OBJECTS

Hans-Dieter Jacoby, Werdorf, and Peter Schmidt, Huettenberg, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

Division of Ser. No. 494,706, May 16, 1983, Pat. No. 4,501,527. This application Jan. 2, 1985, Ser. No. 688,419

Claims priority, application Fed. Rep. of Germany, May 25, 1982, 3219502

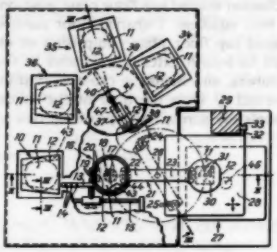
The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.

Int. Cl.[4] B65H *5/00*

U.S. Cl. 414—225 **12 Claims**

1. A device for operating on disk shaped objects comprising a disk cassette, means for adjusting the height of said cassette, a position adjusting station, an inspection station, and means for automatically transporting said disk shaped objects along a path from said disk cassette through said position adjusting station to said inspection station and from said inspection station to a receiving cassette, said transporting means comprising:

a linearly displaceable transport arm mounted between said disk cassette and said position adjusting station and extendable into said disk cassette from the side facing said position adjusting station, said transport arm being laterally spaced from and extending parallel to a center line of said path along which said disk shaped objects are transported from said cassette to said position adjusting station;



means on said linearly displaceable transport arm for eccentrically gripping one of said disk shaped objects;

means at said position adjusting station for centrally gripping the bottom of a disk shaped object;

a pivotal lever having a working range between said position adjusting station and said inspection station; and

means of said pivotal lever for eccentrically gripping one of said disk shaped objects.

4,695,216

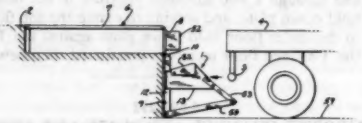
VEHICLE RESTRAINT

Kjell I. Erlandsson, Milwaukee, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

Filed May 14, 1986, Ser. No. 863,054

Int. Cl.[4] B65G *67/02*

U.S. Cl. 414—401 **24 Claims**



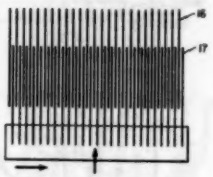
1. A vehicle restraint, comprising a frame mounted on a supporting structure, a slide mounted for vertical movement on said frame, said slide including a inclined surface extending downwardly and outwardly with respect to said supporting surface, said slide having a recess disposed inwardly in a direction toward said supporting structure from the upper end of said inclined surface, biasing means for urging the slide to an upper position relative to said supporting structure, an abutment on a vehicle backing toward said supporting structure disposed to engage said inclined surface to wedge said slide downwardly against the force of said biasing means and effect engagement of said abutment with said recess thereby preventing said vehicle from pulling away from said supporting structure, and release means for releasing said abutment from said recess to enable said vehicle to pull away from the supporting structure.

4,695,217

SEMICONDUCTOR WAFER TRANSFER APPARATUS

John J. Lau, 13350 Floyd Cir., Dallas, Tex. 75243

Filed Nov. 21, 1983, Ser. No. 553,790
Int. Cl.[4] B65G 65/00
U.S. Cl. 414—404 12 Claims



1. Apparatus for receiving and storing at least two pluralities of semiconductor wafers comprising:

a stage adapted to receive and support a container enclosing a plurality of semiconductor wafers;

storage means disposed above said stage including a first plurality of slots for receiving and storing semiconductor wafers;

elevation means disposed within said stage for elevating a plurality of semiconductor wafers from said container for insertion into said storage means; and

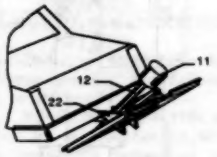
retention means for retaining a first plurality of semiconductor wafers within the odd numbered ones of said first plurality of slots in response to the insertion of a first plurality of semiconductor wafers while permitting insertion of a second plurality of semiconductor wafers into the even numbered ones of said first plurality of lots and for retaining said first and second plurality of semiconductor wafers in said first plurality of slots in response to the insertion of said second plurality of semiconductor wafers, said retention means including an elongate shaft disposed adjacent to the periphery of said first and said second plurality of semiconductor wafers when said semiconductor wafers are disposed within said storage means, said shaft including means for selectively engaging said first and second plurality of semiconductor wafers.

4,695,218

AMBULATORY VEHICLE CARRIER

Elton W. Boyer, 1503 Merion, No. 48J, Seal Beach, Calif. 90740

Filed Mar. 24, 1986, Ser. No. 843,209
Int. Cl.[4] B60R 9/06
U.S. Cl. 414—462 6 Claims



1. A carrier for attachment to the trailer hitch tail stock of a motor vehicle comprising:

a tubular segment having an upper and a lower end;

a reversible electrical motor connected to the upper end of said tubular segment and conformed for electrical excitation from said vehicle, said motor extending a rotary internally threaded sleeve into the interior of said segment;

a screw jack extending into the lower end of said tubular segment to threadably engage said sleeve;

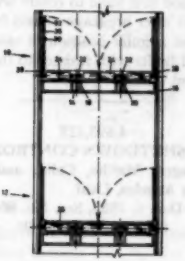
an attachment bracket formed on the exterior of said tubular segment conformed for supported attachment on said tail stock, said attachment bracket being fixed on said segment at a dimension determined by the extension of said screw jack which is substantially equal to the height of said tail stock above ground.

4,695,219

CAGE DECK

Samuel B. McGimpsey, Klerksdorp, South Africa, assignor to Vaal Reefs Mining and Exploration Co., Ltd., South Africa

Filed Oct. 23, 1985, Ser. No. 790,324
Claims priority, application South Africa, Oct. 24, 1984, 848283
Int. Cl.[4] B65G 65/00
U.S. Cl. 414—787 7 Claims



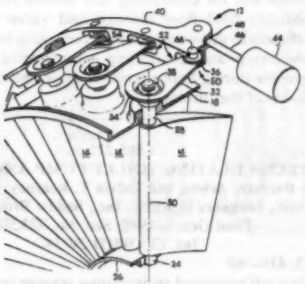
1. A deck for a cage in a materials handling system which includes a pair of rails for a tracked vehicle, the rails extending in a first direction, a plurality of rollers located between and outside the rails, the upper surface of the rollers being at least as high as the upper surfaces of the rails, the rollers being rotatable about axes which are transverse to the first direction, drive means for rotating at least some of the rollers in a selected sense of rotation, and at least one cover which is pivotally mounted and which is movable between an upright position at which the rails, and the rollers, are exposed, and a horizontal position in which it forms a load-bearing platform which overlies at least some of the rollers.

4,695,220

ACTUATOR FOR VARIABLE VANES

John Dawson, Boxford, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Sep. 13, 1985, Ser. No. 775,550
Int. Cl.[4] F04D 29/56
U.S. Cl. 415—9 8 Claims



1. An actuator for rotating a plurality of variable vanes spaced circumferentially about a centerline, each having a

spindle extending through a casing about which the vane is rotatable, comprising:

a plurality of levers, each having first and second ends, respective ones of said levers being fixedly attached to said vane spindle at said lever first end;

an arcuate unison member disposed coaxially about said centerline;

means for rotatably joining said lever second ends to said unison member to cause said levers and said vanes to rotate as said unison member is rotated;

frangible means for allowing a first one of said vanes to be rotated to an angular position different from the angular position of adjacent ones of said vanes upon impact of said first vane by a foreign object; and

limit means operatively associated with said unison member for allowing said first vane to rotate with rotation of said unison member after breakage of said frangible means for maintaining the angular position of said first vane within predetermined limits with respect to the angular position of said adjacent vanes.

4,695,221

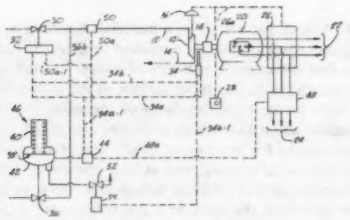
TURBINE SHUTDOWN CONTROL SYSTEM

Judson S. Swearingen, Malibu, Calif., assignor to Rotoflow Corporation, Los Angeles, Calif.

Filed Dec. 4, 1985, Ser. No. 804,677

Int. Cl.[4] F01D *17/06*

U.S. Cl. 415—36 **6 Claims**



1. A turbine shutdown control system for a turbine powered by a fluid source and driving multiple load groups comprising

a first valve disposed between the fluid source and the turbine;

a second valve disposed in parallel with said first control valve between the fluid source and the turbine;

means for sensing a turbine overspeed condition indicating loss of a selected load group and for closing said first control valve in response thereto;

means for monitoring a selected one of the remaining load groups and for controlling said second control valve to modulate fluid flow through said valve in an amount sufficient to drive said selected remaining load group, said monitoring and controlling means being continuously operable during both normal and overspeed running conditions of the turbine.

4,695,222

RECIRCULATING TOILET PUMP ASSEMBLY

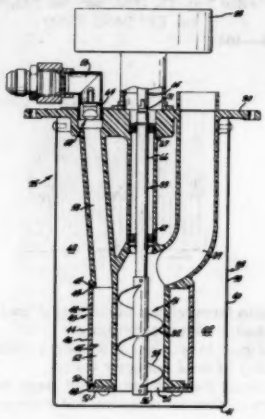
Arthur Barraza, Arleta, and Calvin T. Kearney, Glendale, both of Calif., assignors to Kidde, Inc., Saddle Brook, N.J.

Filed Oct. 8, 1985, Ser. No. 785,580

Int. Cl.[4] B01D *29/38*

U.S. Cl. 415—80 **16 Claims**

12. In a self contained recirculating sewage system including a recirculating pump assembly having a housing positioned in a holding tank and filter means surrounding the housing, a filter rinse assembly comprising a filter rinse member having means for allowing rotation about the housing, said filter rinse member having a side wall spaced adjacent the inside surface of the filter means, said sidewall formed with a plurality of



tangential rinse water spray holes, said holes providing rotation of said filter rinse member and rinsing of said filter means.

4,695,223

TURBOMOLECULAR VACUUM PUMP WITH A ROTOR AND AT LEAST ONE ANTIFRICTION BEARING

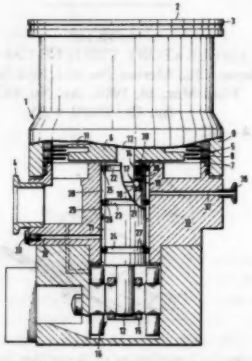
Hans-Peter Caspar, Troisdorf, and Günter Schütz, Cologne, both of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany

Filed Mar. 26, 1986, Ser. No. 844,460

Claims priority, application European Pat. Off., Apr. 4, 1985, 85104096.4

Int. Cl.[4] F04D *29/04*

U.S. Cl. 415—90 **16 Claims**



1. A turbomolecular vacuum pump comprising a rotor and at least one antifriction bearing for said rotor wherein said rotor contains a stationary ring, and a sleeve with a wall against which said stationary ring is seated, said sleeve supported on a casing section of said pump by a plurality of O-rings which consist of elastic material, wherein said sleeve, said casing, and said O-ring form at least one annular space which is filled with a medium which promotes heat flow from the sleeve to the adjacent part of the casing.

4,695,224

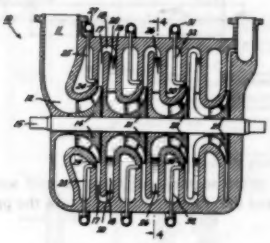
CENTRIFUGAL COMPRESSOR WITH INJECTION OF A VAPORIZABLE LIQUID

Harold Lown, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 637,925, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 336,733, Jan. 4, 1982, abandoned. This application May 16, 1985, Ser. No. 734,941

Int. Cl.[4] F04D *29/58*

U.S. Cl. 415—116 7 Claims



1. A compressor including a housing, a rotatable shaft journaled within said housing, and a plurality of successive compressor stages positioned along the longitudinal axis of said rotatable shaft, with at least one of said compressor stages comprising:

a multi-blade impeller rotatable with said rotatable shaft;

a diffuser adapted to receive a stream of gas from said impeller;

a cross-over channel adapted to receive the gas stream from said diffuser; and

liquid injection means for injecting vaporizable liquid into the gas stream in said diffuser at a high relative velocity with respect to said gas stream, substantially upstream of said cross-over channel adjacent to said impeller said liquid injection means being stationary relative to said impeller, so that said vaporizable liquid is shattered into droplets by said gas stream from said impeller, and so that said droplets are vaporized in said diffuser,

wherein each of said liquid jets is oriented with respect to within a tolerance of about 10 degrees of normal to the gas stream in said diffuser, wherein each of said liquid jets is spaced radially with respect to said axis at a radius in the range of about 1.05 to 1.1 times the maximum radius of said impeller.

4,695,225

AXIAL SWIRL BODY FOR GENERATING ROTARY FLOWS

Jaan Hellat, Rütihof-Baden, and Jakob Keller, Killwangen, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Continuation of Ser. No. 636,499, Aug. 1, 1984, abandoned. This application Jul. 24, 1986, Ser. No. 887,977

Claims priority, application Switzerland, Aug. 30, 1983, 4742/83

Int. Cl.[4] F01D *9/04*

U.S. Cl. 415—189 4 Claims

1. An axial swirl body for generating rotary flows having selectively variable peripheral speeds, said axial swirl body comprising:

(a) an outer tube having a plurality of slots extending therethrough;

(b) an inner tube coaxially mounted within said outer tube;

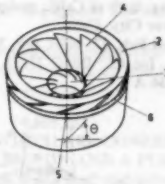
(c) a plurality of exchangeable sets of guide blades, each one of said plurality of exchangeable sets of guide blades comprising a plurality of guide blades, said guide blades and said exchangeable sets of guide blades having the following characteristics:

(i) said plurality of guide blades in each one of said plurality of exchangeable sets of guide blades are not connected to each other;

(ii) each one of the plurality of guide blades in each set of guide blades is sized and shaped to pass through a corresponding one of said plurality of slots in said outer tube and to be held in position between said outer tube and said inner tube without deformation;

(iii) each one of the guide blades in each of said plurality of exchangeable sets of guide blades has the same flow-off angle δ; and

(iv) each set of guide blades has a different flow-off angle δ; and



(d) an annular sleeve surrounding said outer tube and axially movable relative thereto, said annular sleeve being sized and shaped so that, during use of the axial swirl body, said annular sleeve prevents unintended radial movement of the set of guide blades held in position between said outer tube and said inner tube,

whereby:

(e) the peripheral speed of the rotary flow generated by the axial swirl body can be selectively varied by moving said annular sleeve axially relative to said outer tube to expose said plurality of slots and exchanging one set of guide blades for another set of guide blades and

(f) the guide blades in each one of said exchangeable sets of guide blades can be reused repeatedly.

4,695,226

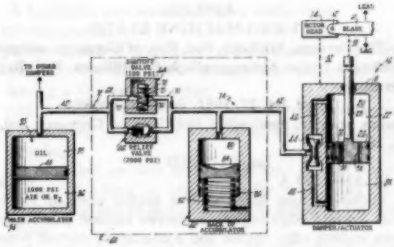
HELICOPTER ROTOR BACKUP DAMPER SYSTEM

Michael J. Marchitto, Orange, and Louis R. Bocciarelli, Branford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 549,389, Nov. 7, 1983, abandoned. This application Feb. 4, 1985, Ser. No. 697,705

Int. Cl.[4] B64C *27/51*

U.S. Cl. 416—106 6 Claims



1. A method of providing a backup mode of operation for a hydraulic system including unequal piston-area dampers and a common main accumulator for providing positive pressure thereto, comprising:

interposing a shutoff valve between each damper and the main accumulator; and

connecting a backup accumulator to each damper on the damper side of the associated shutoff valve for providing a positive pressure thereto in the backup mode;

wherein the shutoff valves are open to permit fluid communication between the main accumulator and the dampers during normal operation, and are closed to prohibit fluid communication between the main accumulator and the dampers in the backup mode of operation.

4,695,227

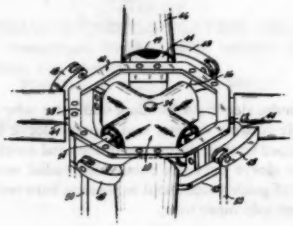
ALL COMPOSITE, CONSTANT SPEED UNIVERSAL JOINT FOR USE IN A SHAFT DRIVEN TILTABLE MAIN ROTOR FOR A HELICOPTER

Robert E. Head, Palos Verdes Estates, and Samuel S. Yao, Fountain Valley, both of Calif., assignors to Hughes Helicopters Inc., Culver City, Calif.

Filed Feb. 27, 1985, Ser. No. 706,444

Int. Cl.[4] B64C *27/35, 27/52*

U.S. Cl. 416—134 A **9 Claims**



1. An improvement in a pitch cone rotor system in a helicopter comprising:

a plurality of rotor blades;

a driven shaft;

a rotor hub coupled to said plurality of rotor blades; universal joint means for resiliently coupling said driven shaft to said rotor hub with three degrees of rotational and three degrees of translational freedom,

whereby said plurality of pitch cone rotor blades are mechanically driven by applied torque,

wherein said means for resiliently coupling said driven shaft and pitch cone rotor blades comprises a first crossbeam rigidly coupled to said driven shaft;

a cruciform case resiliently coupled to said first crossbeam;

a second crossbeam resiliently coupled to said cruciform case, said second crossbeam being coupled to said plurality of pitch cone rotor blades.

4,695,228

TURBO-MACHINE BLADE

Bebe-Titu Purcaru, Mülheim, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Jul. 27, 1981, Ser. No. 286,894

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1980, 3029082

Int. Cl.[4] F01D *5/14*

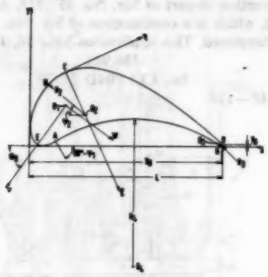
U.S. Cl. 416—223 A **6 Claims**

1. Turbo-machine blade with a profile contour having a convex leading edge region, a convex suction side region, a convex trailing edge region and a concavely curved pressure side region, comprising profile segments being blended into each other forming the profile contour and following each other in a continuous curve, said profile segments including:

(a) a first ellipse segment and a second ellipse segment adjacent to said first ellipse segment in the leading edge region,

(b) a first circle segment adjacent to said second ellipse segment and a second order parabola segment adjacent to said first circle segment in the suction side region,

(c) a second circle segment adjacent to said parabola segment in the trailing edge region, and



(d) a third circle segment adjacent to said second circle segment and said first ellipse segment in the pressure side region.

4,695,229

FRICTION REDUCTION FOR MOVING ELEMENTS IN CONTACT WITH A FLUID MEDIUM

James J. Feuling, 686 Ash, Chula Vista, Calif. 92010

Division of Ser. No. 611,128, May 17, 1984. This application Aug. 4, 1986, Ser. No. 892,374

Int. Cl.[4] B63B *1/34*

U.S. Cl. 416—241 A **9 Claims**

1. In a mechanical device having both active working and passive non-working surfaces, said both surfaces having relative movement with a liquid, said passive surfaces only being coated with a material lyophilic to said liquid, the coated surfaces substantially eliminating boundary layer friction therebetween; wherein said device is a liquid pump having only passive non-working walls of said pumps forming said passive surfaces which are coated with said lyophilic material.

4,695,230

POWER TRANSMISSION

Lael B. Taplin, Union Lake, Mich., assignor to Vickers, Incorporated, Troy, Mich.

Continuation of Ser. No. 808,527, Dec. 13, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 943,823

Int. Cl.[4] F04B *1/26*

U.S. Cl. 417—218 **2 Claims**

1. A variable displacement hydraulic pump control system comprising

a variable displacement pump including a pump adjusting mechanism comprising a hydraulic positioning piston

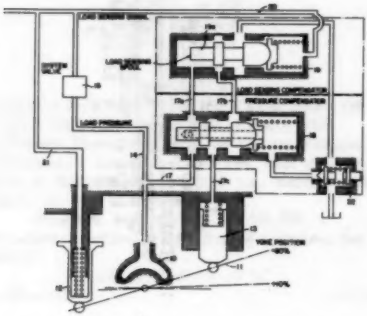
means and spring biased piston means yieldingly opposing said positioning piston means,

load sensing spool compensator means,

said pump having an oultet and an inlet,

first passage means connecting the outlet of the pump to one end of said load sensing spool compensator means for sensing the pressure at the outlet of the pump which is being delivered to a load,

second passage means extending between said load sensing spool compensator means and said positioning piston means for moving said pump adjusting mechanism in



response to activation of said load sensing spool compensator means,

a system valve,

third passage means between the outlet of said pump and said system valve,

fourth passage means extending between the other end of said load sensing spool compensator means and said system valve, and

fifth passage means between said fourth passage means downstream of said system valve and said spring biased piston means.

4,695,231

SONIC IMPELLER FOR SONIC WELL PUMP

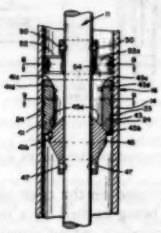
Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Oct. 15, 1985, Ser. No. 787,492

The portion of the term of this patent subsequent to Oct. 11, 2001, has been disclaimed.

Int. Cl.[4] F04F *7/00*; B01F *11/00*

U.S. Cl. 417—241 **10 Claims**



1. A pumping system for pumping fluid out of a well comprising a tubing string for conducting said fluid, said tubing string running down said well,

a rod string fabricated of elastic material contained within said tubing string and running therealong, said rod string being spaced from the tubing string,

vibration generator means for providing vibrational energy to said rod string at a frequency such as to effect resonant standing wave vibration of said rod string, and

a plurality of sonic impeller elements fixedly mounted on said rod string at spaced intervals therealong, said impeller elements each having a cylindrical sleeve with an elongated cylindrical body portion with an outside diameter slightly less than the inside diameter of said tubing string to form a narrow annular gap therebetween, said annular gap filling with said fluid to form a fluid annulus, said fluid annulus presenting acoustic mass impedance which provides a fluid dynamic seal against leak back flow past said body portion,

the sonic energy effecting pumping action of the impeller elements to pump the well fluid up said tubing string.

4,695,232

CENTRAL BODY TO WHICH ARE CONNECTED BOTH A DRIVING MOTOR AND A PUMP

Manfred Klauck, Lebach, Fed. Rep. of Germany, assignor to Flutec Fluidtechinische Gerate GmbH, Sulzbach, Fed. Rep. of Germany

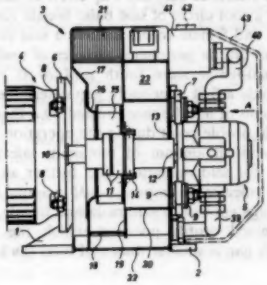
PCT No. PCT/DE84/00080, § 371 Date Dec. 6, 1984, § 102(e) Date Dec. 6, 1984, PCT Pub. No. WO84/03915, PCT Pub. Date Oct. 11, 1984

PCT Filed Apr. 6, 1984, Ser. No. 686,260

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1983, 3312490

Int. Cl.[4] F04B *23/02*

U.S. Cl. 417—410 **12 Claims**



1. A hydraulic powered apparatus, comprising:

a driving motor;

a pump coupled to said motor by a shaft and a coupling such that said driving motor powers said pump, said pump having a suction connector;

a hollow central body having opposite ends connected to said driving motor and said pump and surrounding said coupling;

a fan mounted on said shaft inside said central body and connected with a fan inlet and a fan outlet, said fan inlet being at the end of said central body adjacent said driving motor;

a heat exchanger located within said central body adjacent and receiving air from said fan outlet;

a hydraulic pressure medium tank mounted within said central body, said tank surrounding and being spaced at a radial distance from said shaft, said tank being connected to said suction connector of said pump such that hydraulic

pressure medium from said pressure medium tank is pressurized by said pump.

4,695,233

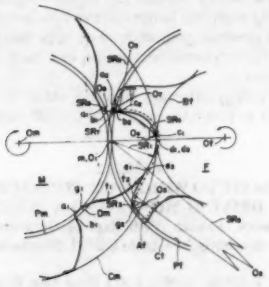
SCREW ROTOR MECHANISM

Kiyotada Miyoshi, Kobe; Noboru Tsuboi, Kakogawa; Kunihiko Nishitani, Akashi; Kazuo Kubo, Kobe, and Shouji Yoshimura, Takasago, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jul. 10, 1986, Ser. No. 884,078

Int. Cl.[4] F04C *18/16, 29/00*

U.S. Cl. 418—83 **1 Claim**



1. A screw rotor of a dry type compressor comprising:

a male and female rotor, said male and female rotor including in a plane perpendicular to axes of said rotors respective rotor tooth profiles which are formed from normal-temperature tooth profiles of basic male and female rotors having no clearance between a tip circle of said basic male rotor and a root circle of said basic female rotor wherein said male and female rotors include a seal coating of 35 μm–45 μm on the peripheral surfaces of said rotors and said normal-temperature tooth profiles at each profile point include a first inter-tooth gap determined by a sum of an amount of interference created by a thermal expansion at said profile point during the operation of the compressors and an amount of minimum safety clearance necessary for said operation, and further an inter-tooth gap is reformed by an amount, equal to a total thickness of seal coatings applied to said male and female rotors, at a predetermined profile point at which the determined inter-tooth gap is smaller than said total thickness of seal coatings.

4,695,234

CENTRAL MECHANISM IN A TIRE VULCANIZING PRESS

Itaru Amano, Kobe; Yasuhiko Fujieda; Katsumi Ichikawa, both of Akashi; Masahide Kanzawa, Kobe; Toshio Yanagihara, Kobe, and Shikao Misumi, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Mar. 7, 1986, Ser. No. 837,169

Claims priority, application Japan, Mar. 29, 1985, 60-47150[U]; Apr. 30, 1985, 60-65624[U]

Int. Cl.[4] B29C *35/00, 33/50*

U.S. Cl. 425—23 **3 Claims**

1. A central mechanism in a tire vulcanizing press, comprising:

a shaping bladder disposed in a central position of a lower die;

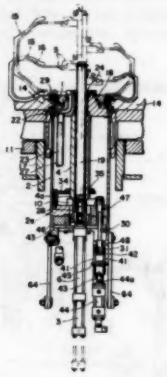
means for supplying a hot pressure medium into said bladder;

a center post for supporting an upper clamp for said bladder;

a support post for supporting a lower clamp for said bladder, wherein said center post is vertically movable and positioned within said support post;

drive means connected to said posts for vertically independently moving each of said posts;

latch means for engaging said support post to prevent descent of the support post during vulcanizing pressing for the tire and for disengaging from said support post to allow the descent of the latter;



means for driving said latch means in opening and closing directions relative to said support post, said latch driving means comprising drive means movable along a vertical axis, means for converting a vertical linear motion of said drive means into a rotational motion around the vertical axis and means for transmitting a thus-obtained rotational motion to said latch means.

4,695,235

BAG-CYLINDER CONTROL DEVICE IN A TIRE VULCANIZER

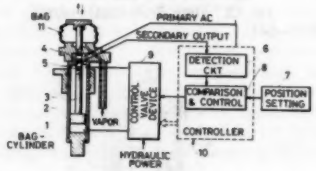
Wataru Ichikawa, Fuchu; Yuji Matsuki, Sayama; Yoshiaki Hirata, and Mikiya Ito, both of Kodaira, all of Japan, assignors to Kabushiki Kaisha SG and Bridgestone Corporation, both of Tokyo, Japan

Filed Oct. 1, 1986, Ser. No. 914,376

Claims priority, application Japan, Oct. 3, 1985, 60-220962

Int. Cl.[4] B29C *33/20, 35/02*

U.S. Cl. 425—29 **5 Claims**



1. A bag-cylinder control device in a tire vulcanizer comprising:

a coil section provided on the open side of a bag-cylinder main body for being excited by a primary ac signal and producing a secondary output signal;

a material provided in a predetermined pattern about a piston rod of said bag-cylinder and consisting of such substance and having such configuration that bring about reluctance change of a magnetic circuit passing through said coil section in response to displacement of said piston rod;

a detection circuit for producing position detection data

representing position of said piston rod in response to the secondary output signal;

position establishing means for establishing stop position data representing a desired position at which said piston rod should stop in accordance with the diameter of a tire to be vulcanized; and

comparison and control means for controlling, in a specified step in a sequence for vulcanizing the tire, stopping of said piston rod in accordance with comparison between the established stop position data and the position detection data.

4,695,236

APPARATUS FOR CONTINUOUS EXTRUSION OF A MULTILAYER SYNTHETIC RESIN WEB

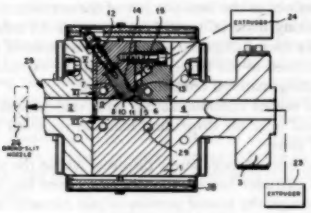
Wilhelm Predöhl, Hennef-Bröl; Heinz Beisemann, Cologne, and Paul Reitemeyer, Troisdorf, all of Fed. Rep. of Germany, assignors to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Feb. 14, 1985, Ser. No. 701,579

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1984, 3405257

Int. Cl.[4] B29C *47/04, 47/92*

U.S. Cl. 425—131.1 **8 Claims**



1. In an apparatus for continuous extrusion of a plastic laminate comprising at least two extrusion screw presses, an accumulator block, a transition unit, and an output die from which a plastic laminate is extruded, wherein the accumulator block has a combining channel, to which said extrusion screw presses are connected and which is connected to said output die by way of said transition unit, the improvement wherein said combining channel has an essentially rectangular cross section with rounded corners, said combining channel being connected at a first end coaxially to a connecting canal with one of said extrusion screw presses and at a second end opposite said first end of said combining channel to said transition unit, said combining channel having downstream of said connecting canal at least one input metering slot connected to said combining channel at a first end of said slot and at a second end of said slot to another of said extrusion screw presses, said input metering slot being positioned between an input tongue formed on a wall of said combining channel and a substantially rectangular cross section adjusting bar recess formed in said block, said adjusting bar recess having a rectangular adjusting bar therein, said input slot extending over a long side of said combining channel, said input metering slot being slanted toward said channel in a downstream direction, and said adjusting bar having a compensating beveled portion for compensating flow across the width of said combining channel and being adjustable in said adjusting bar recess perpendicularly to said slot, said beveled portion being downstream from said slot and being an extension of a surface of said combining channel wall forming said input tongue.

4,695,237

INJECTION MOLDING APPARATUS

Yoshiharu Inaba, Kawasaki, Japan, assignor to FANUC LTD, Minamitsuru, Japan

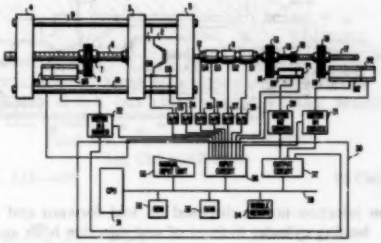
PCT No. PCT/JP84/00619, § 371 Date Jul. 8, 1985, § 102(e) Date Jul. 8, 1985, PCT Pub. No. WO85/02813, PCT Pub. Date Jul. 4, 1985

PCT Filed Dec. 26, 1984, Ser. No. 752,525

Claims priority, application Japan, Dec. 28, 1983, 58-245422

Int. Cl.[4] B29C *45/77, 45/78*

U.S. Cl. 425—135 **11 Claims**



1. An automatic injection conditions setting apparatus for use in an injection molding apparatus comprising:

injection pressure detecting means for detecting an injection pressure;

injection time detecting means for detecting an injection time;

injection quantity detecting means for detecting an injection quantity;

a memory device for storing optimal values of parameters, including a cushion quantity, an injection pressure and an injection speed, for injection conditions corresponding to a time interval from a time at which injection is started to a time at which a maximum injection pressure is obtained, and an injection quantity for the corresponding time interval; and

control means, operable during trial injection, for causing said injection time detecting means and said injection quantity detecting means to detect a time and an injection quantity for which said injection pressure detecting means detects the maximum injection pressure, so long as the trial injection is being performed, and for reading out values of the parameters of the injection conditions from said memory device in accordance with the detected time and the detected injection quantity, to automatically set the readout values of the parameters of the injection conditions as optimal values of the injection conditions for production of injection molding products.

4,695,238

INJECTION MOLDER

Yoshiya Taniguchi, Hyogo, Japan, assignor to Toyo Machinary & Metal Co., Ltd., Hyogo, Japan

Filed Oct. 10, 1985, Ser. No. 786,039

Claims priority, application Japan, Jan. 21, 1985, 60-6443; Mar. 25, 1985, 60-59800[U]

Int. Cl.[4] B29C *45/02*

U.S. Cl. 425—145 **10 Claims**

1. An injection molder comprising:

a heating cylinder having forward and rearward ends and including

an injection hole in said forward end,

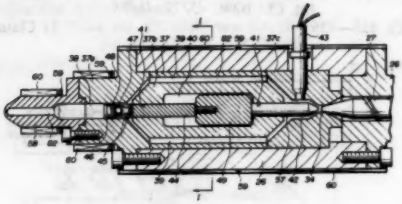
a slide chamber in a middle part of said heating cylinder,

an accumulation chamber for molten resin surrounding said slide chamber,

a piston means having a stop valve means and

a reciprocating plunger attached to said piston means, said reciprocating plunger moving within said slide chamber, said stop valve means being closed when said reciprocat-

ing plunger is moved toward said forward end of said heating cylinder such that said reciprocating plunger causes injection of molten resin into an injection cavity, said stop valve means being opened when said reciprocating plunger is moved toward said rearward end of said heating cylinder charging the molten resin in said accumulation chamber into said injection hole through said stop valve means;



an injection nozzle disposed on said forward end of said heating cylinder in front of said injection hole; and

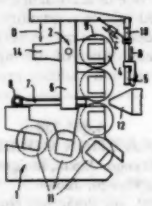
a screw disposed on said rearward end of said heating cylinder, said screw continuously revolving at a stationary position without reciprocating, said screw revolving in one direction for continuously feeding molten resin into said accumulation chamber to the forward end of said heating cylinder.

4,695,239

THERMOPLASTIC SHEET FORMING DEVICE

Wilhelm Klepsch, and Dietmar Plöbst, both of Kaprun, Austria, assignors to Senoplast Klepsch & Co., Austria

Filed Feb. 26, 1986, Ser. No. 833,897
Claims priority, application Austria, Nov. 14, 1985, 3316/85
Int. Cl.[4] B29C *43/46*
U.S. Cl. 425—194 **20 Claims**



9. An apparatus for processing material to material webs, comprising:

a bottom frame;

a bottom feed roll mounted in said bottom frame;

a top frame associated with said bottom frame;

a top feed roll mounted in said top frame;

a smoothing ledge device carried by said top frame in a position offset from said top feed roll;

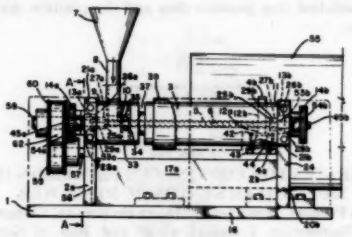
means for selectively positioning said top frame and for positioning one of said top feed roll and said smoothing ledge in an operative position with respect to said lower feed roll.

4,695,240

APPARATUS FOR EXTRUDING SMALL QUANTITIES OF MATERIAL

Hsin L. Li, Parsippany, and Dusan C. Prevorsek, Morristown, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Apr. 4, 1984, Ser. No. 596,497
Int. Cl.[4] B29C *47/00*
U.S. Cl. 425—207 **17 Claims**



1. An extruder apparatus comprising:

(a) an extruder barrel for processing material to be fed to a shaping means, said extruder barrel having an axial bore defined therein, the extruder barrel including a feed portion, a heated portion, and an isolator portion arranged between the feed portion and the heated portion;

(b) feed means communicating with a feed zone of the axial bore defined in the feed portion of the extruder barrel for introducing material to said feed zone of the axial bore;

(c) heating means disposed about a heated zone of the axial bore defined in the heated portion of the extruder barrel for heating material contained therein;

(d) outlet means communicating with said heated zone of said axial bore for dispensing material received from the heated zone;

(e) at least one extruder screw disposed within the axial bore of said extruder barrel and extending from the feed portion through the heated portion of said extruder barrel for transporting material through said axial bore from the feed zone to said outlet means and for forcing material through the outlet means;

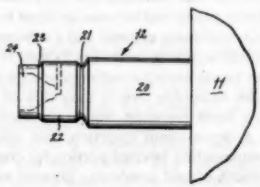
(f) the extruder barrel having surfaces defining isolater means comprising a cavity in the isolator portion of the extruder barrel for thermally isolating the feed portion of the extruder barrel from the heated portion of the extruder barrel.

4,695,241

DIP MOLD AND PROCESS

Joseph J. Ventimiglia, St. Louis, Mo., assignor to Sinclair and Rush, Inc., St. Louis, Mo.

Filed Jan. 24, 1986, Ser. No. 822,047
Int. Cl.[4] B28B *21/46*
U.S. Cl. 425—275 **4 Claims**



1. A one piece dip mold having a longitudinal body with an

outer wall and an internal cavity open at one end and vent passage means extending laterally from the internal cavity to the outer wall of the mold.

4,695,242

PLUNGER MOLDING MACHINE HAVING BLANK LOADING DEVICE

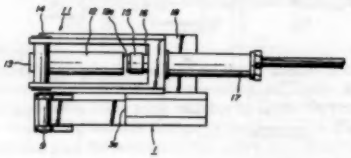
Isao Hattori, Nagoya, and Hifoo Noiri, Hashima, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Sep. 25, 1986, Ser. No. 911,384

Claims priority, application Japan, Oct. 4, 1985, 60-151459[U]

Int. Cl.[4] B28B *3/24*; B29C *47/10*

U.S. Cl. 425—376 R **6 Claims**



1. A plunger molding machine including a material cylinder having at one end an extending die for extruding a blank therethrough and pivotally movable about a pivotal axis provided on a side of the extending die by means of cylinder tilting means, a piston having a size enabling the piston to telescopically slide in the material cylinder, and a fluid plunger for driving the piston, comprising a blank loading device arranged in parallel with moving directions of said piston for molding, and said blank loading device comprising a blank receiving platform for receiving the blank to be molded, chuck means for preventing the blank on said blank receiving platform from being dislodged therefrom, platform tilting means for tilting said blank receiving platform, and platform traversing means for moving said blank receiving platform in translational motion onto a side of said material cylinder to bring an axis of said blank receiving platform into alignment with that of said material cylinder.

4,695,243

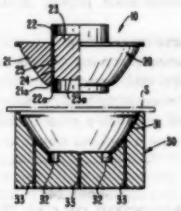
DEVICE FOR MOULDING CONTAINERS

Makoto Watanabe, 2-13-3 Tomihama, Ichihara-Shi, Chiba-Ken, Japan

Division of Ser. No. 813,273, Dec. 24, 1985. This application Oct. 7, 1986, Ser. No. 916,207

Int. Cl.[4] B29C *51/06, 51/20*

U.S. Cl. 425—388 **2 Claims**



1. A device for moulding a synthetic resin container for foods, comprising a male mould including a main body of a selected shape having a lower edge, a bottom forming portion received in said main body for vertical movement therein and having a lower edge, said bottom forming portion being normally so held in the main body that the lower edge of the bottom forming portion projects downwardly beyond the lower edge of the main body by a small distance, a pressurizing portion received in said bottom forming portion for vertical movement therein and having a lower edge, said pressurizing portion being normally so held in the bottom forming portion that the lower edge of the pressurizing portion is positioned above the lower edge of said main body by a small distance; and a female mould having a mating recess for receiving said lower edge of the bottom forming portion in the male mould.

4,695,244

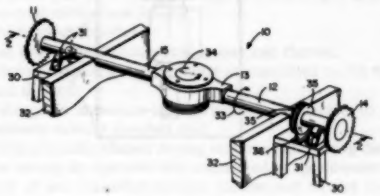
ROTATIONAL ARM FOR MOLDING MACHINE

Peter Friesen, R.R. 1, Box 314, Group 24, Winkler, Manitoba R0G 2X0, Canada

Filed Jan. 6, 1986, Ser. No. 816,406

Int. Cl.[4] B28B *1/20*

U.S. Cl. 425—429 **12 Claims**



1. A rotational molding machine comprising two spaced outside walls each defining an upper surface, a first and a second support, each provided exteriorly of a respective one of the outside walls adjacent said upper surface thereof, a spindle arm for detachable use and supportable mounting between said outside walls, comprising a gear housing having an input drive gear means and an output drive gear means, for orthogonally translating rotational motion of said input drive gear means to said output drive gear means; a cylindrical shaft lying along an axis and having a first end attached to said gear housing and a length greater than approximately one-half the distance between said walls, and having a second end with a rotational drive means attached thereto, for receiving a rotational drive coupling from a driving source mounted on said first support; a hollow cylindrical housing lying along said axis and having a first end attached to said gear housing and a length greater than approximately one-half the distance between said walls, said cylindrical housing being oppositely positioned from said cylindrical shaft relative to said gear housing; a driving shaft in said hollow cylindrical housing and having a first end connected to said input drive gear means and a second end projecting from said cylindrical housing and having a rotational drive means attached thereto for receiving rotational drive coupling from a driving source mounted on said second support; a driven shaft connected to said output drive gear means and projecting externally of said gear housing; first and second bearing means each mounted on a respective one of said supports for receiving and supporting respectivley said cylindrical shaft and said cylindrical housing for rotation about said axis and arranged at a height such that said cylindrical shaft and cylindrical housing extend across said upper surfaces, each of said bearing means being arranged for readily releasing said cylindrical shaft and cylindrical housing for upward movement from said supports and means mounted on one of said supports separate from said bearing means for limiting axial movement of said cylindrical shaft, said hollow cylindrical housing and said gear housing.

4,695,245
COMBUSTION PROCESS WITH IONIZATION CONTROL

Heinz Kotzmann, Buchlesweg 11, D-7142 Marbach 3, Fed. Rep. of Germany

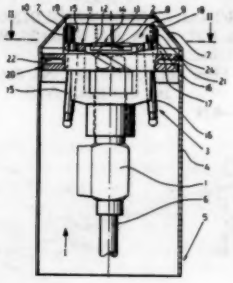
PCT No. PCT/DE85/00136, § 371 Date Jan. 3, 1986, § 102(e) Date Jan. 3, 1986, PCT Pub. No. WO85/05168, PCT Pub. Date Nov. 21, 1985

PCT Filed May 2, 1985, Ser. No. 830,586

Claims priority, application Fed. Rep. of Germany, May 5, 1984, 3416711

Int. Cl.[4] F23M *3/00*

U.S. Cl. 431—9 **14 Claims**



1. Process for producing a sootless flame in a pressure atomizer burner having an oil nozzle for producing an oil atomizing cone, primary air supply channels for supplying a primary air whirl around and in the direction of the atomizing cone and secondary air supply channels for supplying a secondary air whirl around and transversely inwardly toward the primary air whirl, the process comprising the step of supplying at least a major portion of the primary air via primary air supply channels having outlets radially outwardly of the outlet of the oil nozzle adjacent to the transverse plane of the nozzle outlet to produce a primary air whirl around the oil atomizing cone from adjacent the plane of the nozzle outlet and further comprising the step of selecting the flow rates of air via both the primary and secondary air supply channels to provide said primary and secondary air whirls at selected strengths for controlling the length and width of the burner flame.

4. An oil burner having a jacket tube and a burner nozzle assembly mounted coaxially within the jacket tube comprising an oil nozzle for producing an oil atomizing cone, a flame bowl having a bottom with axial air supply means with outlets for supplying a primary air whirl downstream around the atomizing cone from adjacent the transverse plane of the outlet of the oil nozzle and between the nozzle outlet and atomizing cone, the flame bowl having a generally cylindrical peripheral wall, the peripheral wall and jacket tube defining an annular channel therebetween for guiding tertiary air to the burner flame downstream of the flame bowl, radial air supply means in the peripheral wall for supplying air from the annular channel to the interior of the flame bowl for supplying secondary air to the oil burner flame, and air whirling means upstream of said radial air supply means, the radial air supply means comprising axially extending slot-shaped channels provided in the peripheral wall of the flame bowl obliquely relative to a peripheral wall tangent for imparting an angular whirl to the secondary air flowing from the annular channel into the flame bowl, the axial air supply means comprising radial channels in the bottom of the flame bowl having at least sections thereof with said outlets and with a helical shape for producing said primary air whirl.

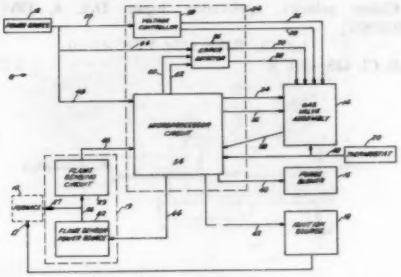
4,695,246
IGNITION CONTROL SYSTEM FOR A GAS APPLIANCE

Robert C. Beilfuss, Coppell; David M. Lanier, Richardson; Stanley E. Bammel, Duncanville; Terry J. Huang, Garland, and David M. Banks, Richardson, all of Tex., assignors to Lennox Industries, Inc., Carrollton, Tex.

Filed Aug. 30, 1984, Ser. No. 645,667

Int. Cl.[4] F27N *5/00*

U.S. Cl. 431—31 **14 Claims**



1. An ignition control system for an appliance operating with a source of gas in response to a demand signal, said appliance including a combustion chamber for receiving said gas and containing a flame, comprising, in combination:

a valve for receiving an interconnect signal and responsively interconnecting said appliance with said source of gas and for receiving a lockout signal for responsively disconnecting said appliance from said source of gas;

an ignition source for receiving a ignition signal and responsively producing a ignite within said combustion chamber to ignite said gas;

a flame sensor for detecting said flame within said combustion chamber, said flame sensor responsively providing a flame signal upon detecting said flame and a blank signal before and after detecting said flame;

a blower for receiving a purge signal and responsively blowing gas out of said combustion chamber;

control means, interconnected to said valve, flame sensor, and blower, for receiving said demand signal and responsively issuing a purge signal to said blower for a first predetermined period and thereafter issuing said interconnect signal to said valve for a second predetermined period after said first predetermined period and for issuing said ignition signal to said spark generator during said second predetermined period, said control means also including

a pulse generator emitting a counting pulse upon said control means receiving a blank signal from said flame sensor after said second predetermined period and a counter for receiving said counting pulse and, after said counter has received a predetermined number of count pulses, issuing a lockout signal to said valve.

4,695,247
COMBUSTOR OF GAS TURBINE

Yoshiki Enzaki; Kazuki Kitahara, both of Kobe; Satoru Terasaka, Kakogawa; Kenji Mori, Akashi, and Takeshi Kimura, Kobe, all of Japan, assignors to Director-General of the Agency of Industrial Science & Technology, Japan

Filed Feb. 26, 1986, Ser. No. 833,268

Claims priority, application Japan, Apr. 5, 1985, 60-71055

Int. Cl.[4] F23D *14/02*

U.S. Cl. 431—352 **8 Claims**

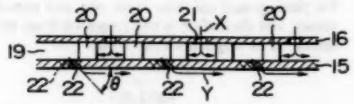
1. A combustor of a gas turbine comprising:

wall means of double wall construction including an outer

plate member and an inner plate member located at least in one part of the combustor;

connector means including a multiplicity of connector pins formed of heat conductive material for connecting together the outer plate member and inner plate member of the wall means; and

cooling air flow aperture means including a multiplicity of cooling air inlet apertures formed in the outer plate member to introduce cooling air therethrough from outside into a spaced defined between the outer and inner plate



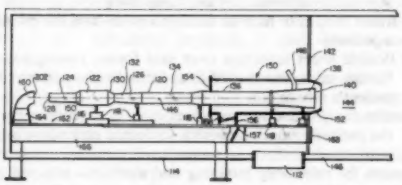
members perpendicularly to an outer surface of the inner plate, and a multiplicity of cooling air outlet apertures formed in the inner plate member to allow the cooling air to flow along an inner surface of the inner plate after being released into the interior of the combustor from the space between the outer and inner plate members, said cooling air outlet apertures formed in said inner plate member being inclined and said cooling air inlet apertures formed in said outer plate member being greater in diameter but smaller in total area than said cooling air outlet apertures.

4,695,248

PULSE COMBUSTION DRYING APPARATUS FOR PARTICULATE MATERIALS

Robert R. Gray, 7110 Via Monte Mar Dr., Gladstone, Oreg. 97027

Filed Oct. 3, 1985, Ser. No. 783,861
Int. Cl.[4] F27B *15/00*; F27D *7/00*; F23C *11/04*
U.S. Cl. 432—58 **6 Claims**



1. Improved pulse jet combustor apparatus for the drying of particulate material comprising:

a pulse jet combustor including

a combustion chamber, an air inlet conduit connected to one end thereof, a primary exhaust outlet conduit connected to the other end thereof, an elongate tailpipe section disposed downstream of said exhaust conduit and a frusto-conically shaped drying section connected to said tailpipe section

an augmenter duct having an upstream end positioned to receive secondary back flow exhaust gas emanating from said inlet conduit and a downstream end disposed remote therefrom,

a sleeve member having an upstream and a downstream end disposed in surrounding spaced relation with said tailpipe and drying sections and having its downstream end disposed in surrounding proximate relation with the downstream end of said drying cone,

conduit means interconnecting the downstream end portion of said augmenter duct with the upstream end of said sleeve member for effecting the introduction of secondary back flow exhaust gas therein and

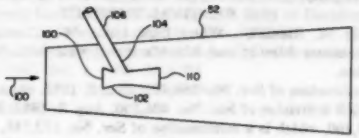
means for controlling the volume of said secondary back flow exhaust gas directed from said augmenter duct into said sleeve member.

4,695,249

FEED SYSTEM FOR PARTICLE DRYING PULSE JET COMBUSTORS

Robert R. Gray, 7110 Via Monte Mar Dr., Gladstone, Oreg. 97027

Filed Oct. 3, 1985, Ser. No. 783,859
Int. Cl.[4] F27B *15/00*; F27D *7/00*; F23C *11/04*
U.S. Cl. 432—58 **4 Claims**



1. In pulse jet combustor apparatus for the drying of particulate material of the type having

a combustion chamber,

an air inlet conduit connected to one end thereof,

a primary exhaust gas outlet conduit connected to the other end thereof,

an elongated transition-tailpipe section connected to said primary exhaust conduit, and

a frusto-conically shaped drying section of increasing diameter having its upstream end connected to the downstream end of said transition-tailpipe section and having means for introducing a feed stock of particulate material to be dried therein,

the improvement wherein said last mentioned means comprises an open-ended tube disposed in spaced relation with the surrounding wall of the upstream end of said frusto-conically shaped drying section and in concentric relation with the longitudinal axis thereof,

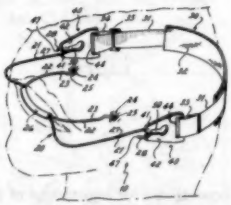
a feed stock delivery tube connected to said open-ended tube intermediate the ends thereof for introducing said feed stock into the path of exhaust gas passing through said tube.

4,695,250

BREAKAWAY ORTHODONTIC FACE BOW APPLIANCE

James F. Mariol, Cincinnati, Ohio, assignor to Fairdale Orthodontic Company, Cincinnati, Ohio

Filed Jun. 23, 1986, Ser. No. 877,326
Int. Cl.[4] A61C *7/00*
U.S. Cl. 433—5 **12 Claims**



1. An orthodontic appliance comprising:

a generally U-shaped wire face bow having rearwardly facing arms terminating in hooked ends integrally formed of the wire,

an elastic headband connected between the opposite ends of said face bow for applying tension to the arms of said face bow,

a pair of breakaway connectors, each connected between an opposite one of the ends of said headband and a corresponding opposite one of the ends of said face bow such that said breakaway connectors are the only elements making the connection between the headband and the hooked ends of said face bow, and

each of said connectors being formed of a single molded plastic piece and shaped so as to make a snap-fit connection around the wire of one of said hooked ends.

4,695,251

ORTHODONTIC BRACKET ADHESIVE AND ABRASIVE FOR REMOVAL THEREOF

Ronald M. Randklev, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 559,401, Dec. 8, 1983, abandoned, which is a division of Ser. No. 406,500, Aug. 9, 1982, Pat. No. 4,435,160, which is a continuation of Ser. No. 172,218, Jul. 25, 1980, abandoned, which is a continuation-in-part of Ser. No. 137,631, Apr. 7, 1980, abandoned. This application Jan. 23, 1985, Ser. No. 694,477

Int. Cl.[4] A61C *3/00, 13/10*

U.S. Cl. 433—8 **7 Claims**

1. An article of manufacture comprising an orthodontic bracket adhesive composition consisting essentially of a finely divided, non-toxic inorganic filler admixed with a polymerizable resin, said filler being essentially insoluble in mouth fluids, having a Mohs hardness less than about 3 and a mean particle diameter between about 1 and about 100 micrometers, with said filler being at least 25% of the total weight of said composition, and with said adhesive composition being disposed adjacent to an orthodontic bracket and being substantially free of adjuvants in amounts which would damage tooth enamel upon removal of said adhesive from said tooth enamel.

4,695,252

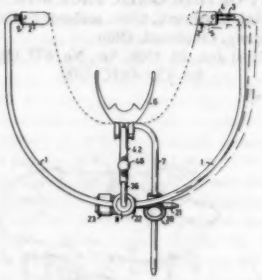
QUICK MOUNT FACE-BOW DEVICE FOR AN ARTICULATOR

Svante R. Edwardson, Solna, Sweden, assignor to AB Dentatus, Hagersten, Sweden

Filed Dec. 5, 1985, Ser. No. 804,635

Int. Cl.[4] A61C *19/04*

U.S. Cl. 433—73 **12 Claims**



1. A face-bow device for registration of a patient's face and for transferring the registration to an articulator, for use in making dentures or parts thereof, including:

a bite fork on a bite fork support;

an adjustment means, in which said bite fork support is insertable,

a bow means extending from ear to ear in front of said patient's face, on which bow means said adjustment means is mountable,

said bow means having two arms firmly connected to each other, each arm having an integral, inwardly bent free end provided with an ear piece adapted to be placed in said patient's ear meatus, said free ends being aligned, said ear pieces being adjustably mounted directly on said free ends and adjustable toward and away from each other relative to said free ends,

said arms being made of a resilient material and having sufficient resiliency to be resiliently outbendable at least to such an extent that a bow means having its free ends at a distance from each other adapted to the distance between the openings to said patient's ear meatuses in outbent condition is movable over the sides of said patient's face for placing said ear bow ends into said patient's ear meatuses, and thereafter, when removed from the patient, to return to its original shape of said bow.

4,695,253

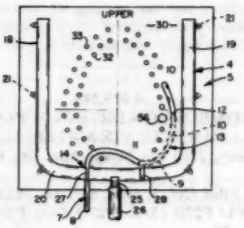
ORAL EVACUATION DEVICE AND METHOD

Thomas M. Tysse, 2415 Pebblebrook, SE., Grand Rapids, Mich. 49506

Filed Mar. 8, 1985, Ser. No. 709,891

Int. Cl.[4] A61C *5/14*

U.S. Cl. 433—136 **42 Claims**



1. An oral evacuation device, comprising:

a frame shaped to fit over at least a portion of the mouth of a patient;

a flexible sheet stretched over said frame, having top and bottom sides, and shaped to cover at least a portion of the patient's mouth;

means for positioning said sheet over an operating area of the patient's mouth on which a selected procedure is to be performed;

means for releasably retaining said sheet in a selected position with respect to the operating area of the patient's mouth;

an evacuation tube, having a hollow body with a sidewall, and first and second ends; the first end of said evacuation tube being shaped for communication with a source of suction, and the second end of said evacuation tube having a plurality of apertures, which are spaced along the length thereof, and extend through the sidewall of said evacuation tube for aspirating materials therethrough;

first and second apertures disposed in said sheet through which the second end of said evacuation tube is threaded to form a flexible loop on the bottom side of said sheet;

said second end of said evacuation tube being resiliently flexible to permit adjusting the shape and orientation of said evacuation tube loop into an operating position that conforms with the shape and orientation of the patient's mouth by extending downwardly from said first sheet aperture into and along the tongue side of the patient's mouth to a rearward, lower portion of the patient's mouth in which saliva collects, and thence upwardly through said second sheet aperture; and

means for releasably retaining said evacuation tube loop in the operating position, whereby throughout the operating procedure, said evacuation tube automatically and continuously removes saliva, and the like directly from the

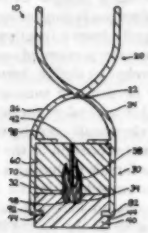
lower portion of the patient's mouth for improved operating efficiency and increased patient comfort.

4,695,254

TOOTH REPLACEMENT

John M. Herrell, 106 Hazard Rd., Carpentersville, Ill. 60110

Filed Oct. 24, 1985, Ser. No. 790,868
Int. Cl.[4] A61C *11/00*
U.S. Cl. 433—213 **17 Claims**



1. A method for providing an artificial, replacement tooth for to avoid gaps caused by a pulled tooth in a mouth; wherein said artificial tooth has at least one root and a crown and wherein said method comprises:

a. reconstructing a defective tooth in place in said mouth to form a reconstructed tooth, having at least one natural root and a reconstructed portion;
b. extracting said reconstructed tooth having said at least one natural root and said reconstructed portion to form a empty socket in said mouth;
c. forming a die to shape an artificial tooth using said extracted, reconstructed tooth as a model;
d. making a mold from the die;
e. filling said mold with a pharmaceutically acceptable resin;
f. hardening said pharmaceutically acceptable resin to form an artificial tooth having said at least one root and said crown as a substantial duplicate of said reconstructed tooth;
g. removing said artificial tooth from said mold; and
h. inserting said artificial tooth into said socket to permit a jaw to grow around said at least one root of said artificial tooth and seat said artificial tooth in said jaw.

3. A mold assembly for forming an artificial tooth having roots and a crown wherein:

a. said mold assembly includes a mold form and a removable clamping means for holding said mold form together;
b. said mold form includes a root piece and a cap piece;
c. said root piece and said cap piece are secured together by said clamping means;
d. said root piece forms a root of said artificial tooth and said cap piece forms a crown of said artificial tooth;
e. said clamping means removably secures said root piece and said cap piece together;
f. a flexible spacer is inserted between said cap piece and said root piece; and
g. said clamping means compresses said flexible spacer to hold said mold tightly.

4,695,255

METHOD OF COOLING AND LUBRICATING HUMAN HARD TISSUE DURING POWER TOOL CUTTING

Thad J. Overmyer, 132 N. Second St., Danville, Ky. 40422

Filed May 27, 1986, Ser. No. 866,928
Int. Cl.[4] A61C *5/00*
U.S. Cl. 433—215 **4 Claims**

1. A method of cooling and lubricating human hard tissue during power tool cutting thereof which comprises

(a) admixing about 25% to 70% by volume of water and about 5% to35% by volume of potable alcohol and about 10% to 45% by volume of glycerin, and

(b) directing a flow of the admixture against the hard tissue subjected to cutting.

4,695,256

METHOD FOR PRACTICING AIMING WITH THE USE OF A LASER FIRING SIMULATOR AND OF A RETROREFLECTOR ON THE TARGET SIDE, AS WELL AS FIRING SIMULATOR FOR CARRYING OUT THIS METHOD

Kurt Eichweber, Hamburg, Fed. Rep. of Germany, assignor to Precitronic Gesellschaft, Hamburg, Fed. Rep. of Germany

Filed Dec. 23, 1985, Ser. No. 812,793
Claims priority, application Fed. Rep. of Germany, Dec. 31, 1984, 3447887; Oct. 9, 1985, 3436108
Int. Cl.[4] G09B *9/00*
U.S. Cl. 434—22 **15 Claims**

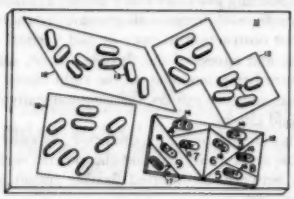
5. A firing simulator for practising aiming with the use of a taget equipped with a retroreflector which simulator comprises a laser beam emitter for emitting light in the direction of said target, a receiver for the laser light reflected by the target, a laser range finder responsive to said reflected light, means for detecting the position of light reflected by the target relative to a reference line, a trigger for triggering a simulated discharge of a projectile, an evaluating arrangement for the determination of the hit position after the elapse of projectile flight time, measurement means for measurement of the angular velocity of the target in relation to the reference line and of aiming-off allowance, said measurement means being connected with the evaluating arrangement in such a manner that their measurement results related to the time of discharge of the projectile can be coupled to the evaluating arrangement.

4,695,257

PROBLEM SOLVING GAME

James R. Vawter, 688 Coronado Dr., Sedalia, Colo. 80135

Filed Apr. 26, 1985, Ser. No. 727,667
Int. Cl.[4] G09B *1/06*
U.S. Cl. 434—333 **18 Claims**



1. An educational game comprising tiles having answer bases and adapted to provide a view of problem bases on a game surface when the answer bases are correctly positioned on said problem bases and

a game surface having at least one of a series of predeter-

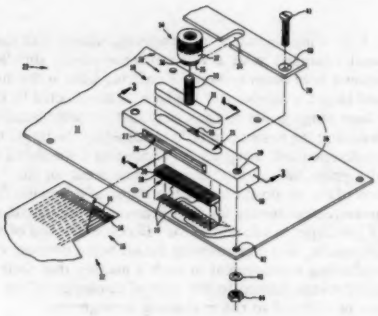
mined undivided geometric shapes thereon, each geometric shape having a plurality of problem bases each of which has (a) a problem made up of at least two numbers, at least one operand, and at least one equal symbol disposed in a format which provides at least one problem to be answered by an answer displayed on a tile; and (b) is surrounded by an undefined area of the geometric shape so that the answer base of each tile, when correctly positioned upon the problem bases, causes the tiles to duplicate the predetermined geometric shape of each of the geometric shapes of the series and displays to the player both the problems and an answer to each of the problems.

4,695,258

CONNECTOR ASSEMBLY FOR ELECTRICALLY CONNECTING FLEXIBLE AND RIGID PRINTED CIRCUITS

Daniel R. Hanson, and Ludwig D. Nesheim, both of Minneapolis, Minn., assignors to Cherne Industries, Inc., Minneapolis, Minn.

Filed Dec. 9, 1986, Ser. No. 939,715
Int. Cl.[4] H01R 9/09
U.S. Cl. 439—67 **13 Claims**



1. A unitary connector and alignment assembly for electrically connecting flexible circuits to rigid circuits comprising:

a. an alignment structure having horizontal and vertical support and positioning means to align the flexible circuit for electrical communication with the rigid circuit, said alignment structure having a vertical aperture in its bottom extending inwardly and a unitary horizontal aperture in its side, said horizontal aperture extending inwardly without obstruction to open at said vertical aperture for ingress and egress of the flexible circuit, said alignment structure being mounted on the rigid circuit so that said vertical aperture covers the communicative portions of the rigid circuit;

b. an elastomeric vertical conductor disposed within said vertical aperture so that said elastomeric vertical conductor is between the inserted flexible circuit and the rigid circuit; and

c. a hand operable clamping member connected to said alignment structure and moveable within said vertical aperture, above said elastomeric vertical conductor, to releasibly urge the flexible circuit and the rigid circuit into contact with said elastomeric vertical conductor.

4,695,259

WATERPROOF LAMP SOCKET CONSTRUCTION

Kihachirou Uchida, Shimizu, Japan, assignor to Koito Seisakusho Co., Ltd., Tokyo, Japan

Filed Sep. 24, 1985, Ser. No. 779,642
Claims priority, application Japan, Sep. 26, 1984, 59-145359[U]
Int. Cl.[4] H01R 13/52
U.S. Cl. 439—271 **4 Claims**

1. A waterproof lamp socket construction, comprising in combination:

a socket body having a hollow extending axially therethrough, the hollow including a large diameter portion extending rearwardly from a front end of the socket body and a smaller diameter portion adjacent a rear end of the socket body thereby to define between the larger and smaller diameter portions an annular step portion which faces toward said front end of the socket body;

a tubular ferrule of electrically conducting material received in the larger diameter portion of the hollow in the socket body, said tubular ferrule including a wedge shaped protuberance which is embedded in the inside surface of the socket body thereby to lock the tubular ferrule against displacement relative to the socket body;

an insulating plate having a foot contact thereon and mounted within the ferrule for axial displacement within limits;

a cylindrical packing of elastic material intimately plugged into the smaller diameter portion of the hollow in the socket body for watertightly sealing the rear end of the hollow, the packing including a flange on a front end thereof and a first annular rib formed on a rear surface of said flange, said first annular rib being intimately held against said annular step portion of the socket body, said packing further including second annular ribs about a major portion thereof and pressed against the wall of the smaller diameter portion of the hollow of the socket body, said first and second annular ribs being arranged to constitute a labyrinth seal;

a spring compressed between the insulating plate and the flange of the packing thereby to bias said insulating plate and said flange in opposite directions thereby pressing said annular rib against said annular step portion; and

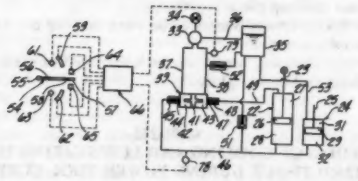
an annular gasket disposed about the socket body, said gasket having a pair of opposite ridges one of which is fast held against a flange formed about the socket body.

4,695,260

TILTING DEVICE FOR MARINE PROPULSION DEVICE

Hideo Suzuki, Shizuoka, and Kazunobu Nozue, Kosai, both of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Japan

Filed Nov. 7, 1984, Ser. No. 669,317
Claims priority, application Japan, Nov. 15, 1983, 58-213196
Int. Cl.[4] B63H 5/12
U.S. Cl. 440—61 **9 Claims**



1. A tilt mechanism for a marine outboard drive supported for tilting movement about a generally horizontally extending tilt axis relative to a watercraft, power means for selectively effecting tilting movement of said outboard drive about said tilt axis, and control means for selectively activating said power

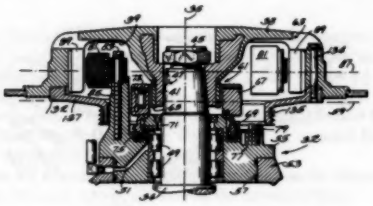
means, said control means including a control element movable between a null position and an activated position and a control device for selectively energizing said power means continuously upon the activation of said control element from its null position to its activated position without necessitating an operator to maintain said control element in its activated position, said control device further being selectively operable to actuate the power means only so long as the operator activates said control element to its activated position.

4,695,261

MARINE PROPULSION ENGINE VOLTAGE GENERATOR ARRANGEMENT

George L. Broughton, and James E. Macier, both of Waukegan, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Jul. 3, 1985, Ser. No. 752,258
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—900 **16 Claims**



1. A marine propulsion device comprising a lower unit including a rotatably mounted propeller, and internal combustion engine mounted on said lower unit and drivingly connected to said propeller, said engine including an engine block, a crankshaft and flywheel assembly including a crankshaft rotatably supported by said engine block and having an end extending from said engine block, and a flywheel mounted on said end of said crankshaft for rotation therewith, and a voltage generator including a magnet mounted on one of said assembly and said engine block, and a coil mounted on the other of said assembly and said engine block, said coil being radially spaced from said magnet, and an annular power takeoff pulley mounted on said flywheel and surrounding said voltage generator in adjacent relation thereto axially of said crankshaft.

4,695,262

TOY ROTATING GEAR ACCESSORY FOR USE WITH GYROSCOPIC TOP

Michael A. Crosby, Hawthorne, and Art J. Foss, Torrance, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jun. 23, 1986, Ser. No. 877,580
Int. Cl.[4] A63H *1/00*
U.S. Cl. 446—236 **5 Claims**

1. A toy rotating gear accessory for use with a gyroscopic top, comprising:

a supporting body having a plurality of apertures passing therethrough; and

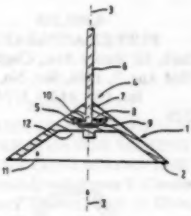
a plurality of gears removably and rotatably engaged to said supporting body, each of said gears having (a) teeth means at the outer circumference thereof for engaging at least one other of said teeth means of another of said gears, (b) upwardly-extending flexible member means attached thereto for removably enaging one of said apertures, (c) support means attached thereto for supporting said rotating gear accessory on a horizontal surface, (d) an upwardly-extending portion with an aperture therein, said aperture in said portion adapted for engaging said gyroscopic top and (e) a number of protuberances located on the top surface thereof, said protuberances adapted for supporting said body so that said body rests on top of said protuberances and clearance is provided between said top surface and said body.

4,695,263

TOY SPINNING TOP HAVING A LEG SUPPORT

Peter Balleis, Zirndorf, Fed. Rep. of Germany, assignor to Lorenz Bolz GmbH & Co., Zirndorf, Fed. Rep. of Germany

PCT No. PCT/DE85/00330, § 371 Date Jun. 12, 1986, § 102(e) Date Jun. 12, 1986, PCT Pub. No. WO86/02280, PCT Pub. Date Apr. 24, 1986
PCT Filed Sep. 24, 1985, Ser. No. 887,104
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 8430096[U]
Int. Cl.[4] A63H *27/00*
U.S. Cl. 446—256 **3 Claims**



1. Toy spinning top comprising

a top body which rotates about a stationary to shaft (6); and

a base (1) made of an injection moldable or castable plastic for holding the top shaft (6) in a substantially vertical orientation, with the top shaft (6)

being supported in a vertical aperture (7) of the base (1); and being secured against removal from the base (1) by a spring ring (5) placed onto its lower end; and the spring ring (5) is provided, at the side facing the floor when the top is stood up, with a covering hood (9) which extends over the plane of the spring ring (5) and covers the lower end of the top shaft (6) in the manner of a hat,

characterized in that the spring ring (5) and its covering hood (9) are embedded in the plastic material of the base (1).

4,695,264

CONVERTIBLE STUFFED FIGURE

Marvin K. McLeod, Jr., Rte. 1, Box 201A, Valley, Wash. 99181

Filed Jun. 27, 1986, Ser. No. 879,570
Int. Cl.[4] A63H *3/00*
U.S. Cl. 446—321 **20 Claims**

1. A toy including interconnected eversible figures, comprising:

a first complete foldable figure having a shaped external surface and an internal surface surrounding a first internal cavity;

a second complete foldable figure having a shaped external

surface independent of the external surface of the first foldable figure and an internal surface surrounding an individual second internal cavity;

wherein the individual external surfaces of the first and second foldable figures are joined together along a common seam;

wherein the common seam defines an opening common to the individual first and second internal cavities of both figures; and

means joining the internal surfaces of the first and second figures at a common location along the internal surfaces opposite the opening and distinct from the common seam for eversing one figure into the internal cavity of the other figure as the other figure is folded outward of the one figure to expose the shaped external surface thereof and such that the one figure progressively fills the internal cavity of the other figure to function as stuffing for the other figure.

4,695,265

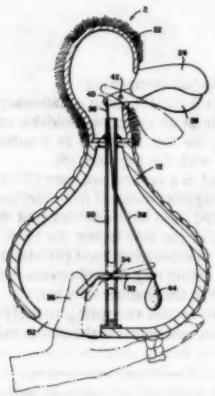
PUPPET APPARATUS

Maynard H. Clark, 8E Butler Ave., Chalfont, Pa. 18914

Filed Apr. 7, 1986, Ser. No. 848,656

Int. Cl.[4] A63H *3/14*

U.S. Cl. 446—329 **12 Claims**



1. A puppet which is operable by one hand of a puppeteer, comprising,

a body,

a head mounted on the body, said head being mounted for pivotal movement about a first axis in order to turn with respect to the body,

said head having a face provided with a facial element which is movably mounted on the head,

an actuator member located inside said body and being movable by the puppeteer to turn the head relative to the body and to move the facial element relative to the head,

said actuator member being connected to the head and being movable in a first direction of travel to turn the head relative to the body,

said actuator member being connected to the facial element and being movable in a second direction of travel to move the facial element relative to the head, said second direction of travel being different from said first direction of travel,

said actuator having two surfaces which face toward each other and are spaced apart to provide a horizontal space for receiving therebetween a puppeteer's thumb which is parallel to said first axis, said surfaces being elongated in directions which extend away from said first axis.

4,695,266

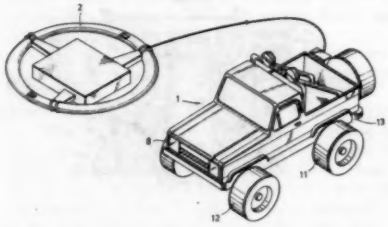
STEERABLE ELECTRIC TOY CAR

Hsu W. Hui, No. 160, Wu Fu I Road, Kaohsiung City, Taiwan

Filed Sep. 17, 1986, Ser. No. 908,235

Int. Cl.[4] A63H *33/00*

U.S. Cl. 446—454 **8 Claims**



1. A steerable electric toy car comprising:

a toy body, including

a frame,

a rear shaft rotatably mounted transversely on an underside of a rear portion of said frame;

a pair of first wheels fixedly mounted at opposite ends of said rear shaft, adapted to be driven by a rear motor forwards and backwards,

a front shaft, rotatably mounted transversely on the underside of a front portion of said frame;

a pair of second wheels fixedly mounted respectively at opposite ends of said front shaft; and

means for controlling said front shaft to move with respect to a longitudinal axis of said frame, including a jointed control plate attached to said front shaft; a control rod engaged with and extending vertically with respect to said jointed plate; a gear mechanism including an output end coupled to said control rod, and a front motor having an output shaft coupled with an input end of said gear mechanism so that rotation from said output shaft can be transmitted to drive said control rod; and

a steering mechanism, including

a grip member, adapted to be controlled by a player; contact means disposed on said grip member and electrically connected to said front motor of said toy body; and

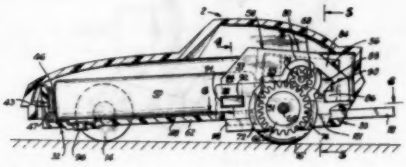
a weight body, pivotedly suspended by one end thereof on said grip member, with a weight disposed at another end of said weight body, and an activating finger disposed on said weight body near the pivoted end of the weight body in such a position that when said grip member is rotated, and said weight causes said weight body by gravity to remain vertically oriented to the ground, thereby the change of relative position of said weight body to said grip members will cause said activating finger to contact said contact means to close a circuit for driving said front motor.

4,695,267

BATTERY-POWERED SMALL-SCALE TOY VEHICLE

Thomas L. Simmel, 44 Booras La., Milford, Conn. 06460; David W. Crossley, Pennington, and Mark N. Morehouse, Ridgefield, both of N.J., assignors to Robert S. McDarren; Barry Y. Piels, both of Ridgefield and Thomas L. Simmel, Milford, all of, Conn.

Filed Feb. 8, 1985, Ser. No. 699,700
Int. Cl.[4] A63H *17/26*
U.S. Cl. 446—462 20 Claims



1. A chassis for use in a toy vehicle powered by a battery, the chassis having a floor and a pair of integral side walls on the floor which support an axle carrying a pair of driven rear wheels, the axle and the wheels being driven by a main spur gear and a pair of free-turning front wheels spaced apart from the driven wheels, each side wall having an upward-facing notch, the chassis further comprising:

means for releasably supporting the battery on the chassis on the forward side of the axle of the driven wheels;

electric motor means having a motor spur gear for coupling rotation to the driven wheels, the electric motor means further having a pair of outwardly and oppositely extending bosses, each boss of the pair of bosses being received in one of the notches of the side walls;

conductor means for making electrical connection between the electric motor means and the battery; and

motor mount means releasably coupled to the side walls, the motor mount means clamping the electric motor means immediately above the axle of the driven wheels so that the main spur gear is engaged by the motor spur gear and so that the electric motor means may be connected to the battery and so that there is no interposition of parts between the bottom of the electric motor means and the underlying axle.

4,695,268

AUTOMATIC TENSIONER HAVING LOCKING MECHANISM

Hisashi Kodama, Nagoya, and Yoshio Okabe, Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 29, 1986, Ser. No. 925,112
Claims priority, application Japan, Oct. 29, 1985, 60-166452
Int. Cl.[4] F16H *7/08*
U.S. Cl. 474—110 3 Claims

1. An automatic tensioner having a locking mechanism, comprising:

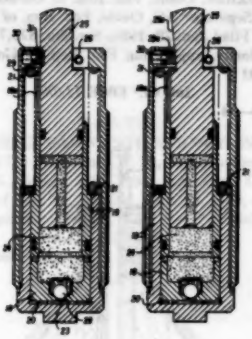
a large oil chamber formed at the bottom of a body of the tensioner and containing oil;

a plunger biased toward the large oil chamber by a spring and inserted in the body so as to be slidable;

a hole formed at the center of the plunger;

a rod having a head that protrudes from the body of the tensioner, the rod being slidably inserted in the hole so as to form a small oil chamber containing oil, the small oil chamber being in communication with the large oil chamber through a narrow passage, the end surface of the head of the rod being pressed against an external device or element, such as a belt; and

a piston which is received in the body of the tensioner and normally biased into contact with the plunger and which, when oil leaks from the large oil chamber to thereby



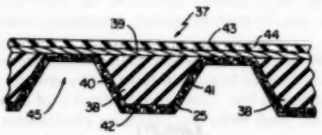
lower the plunger, is permitted to protrude into engagement with the rod, locking the rod.

4,695,269

LAYER OF REINFORCED POLYMERIC MATERIAL, METHOD AND APPARATUS FOR MAKING THE SAME AND A PRODUCT CONTAINING THE SAME

Joseph V. Tassone, Kettering, and James T. Candor, Washington Township, Montgomery County, both of Ohio, assignors to Dayco Products, Inc., Dayton, Ohio

Division of Ser. No. 465,960, Feb. 14, 1983, Pat. No. 4,559,188.
This application Sep. 20, 1985, Ser. No. 778,580
Int. Cl.[4] B32B *27/12*; F16G *1/04*
U.S. Cl. 474—268 8 Claims



1. In a belt construction formed from a plurality of parts of which one part thereof comprises a layer of material forming at least part of the exterior surface of said belt construction and that initially was a substantially flat layer of material having opposed substantially parallel spaced apart flat surfaces and comprising polymeric material and a fabric sheet means disposed in said polymeric material between said surfaces and being substantially coextensive therewith, the improvement wherein said layer of material has reinforcing particles therein with at least part of said particles having the long dimensions thereof oriented so as to be substantially perpendicular to said surfaces of said layer of material and to said part of said exterior surface of said belt construction and with at least some of the thus oriented particles extending through said fabric sheet means.

4,695,270

DRUM FOR CLARIFYING AND SEPARATING CENTRIFUGATES

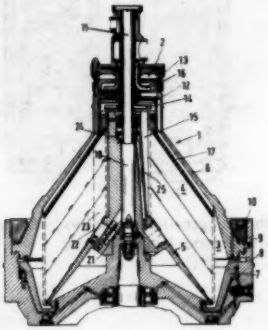
Karl-Heinz Zettier, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jan. 29, 1986, Ser. No. 823,707

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503581

Int. Cl.[4] E04E *11/00*

U.S. Cl. 494—34 **8 Claims**



1. In a device for clarifying and separating centrifugates, having a rotatable drum, a stationary inlet pipe extending into an inlet chamber and which rotates along with the drum, at least one skimmer for diverting the clarified or separated centrifugates, through an aperture that is wider than the inlet pipe, outlets extending from the inlet chamber into an antechamber that communicates with channels ascending through a set of nested plates within the drum and an annular space upstream of the inlet chamber and that communicates with the inlet chamber through an annular channel, the improvement comprising: means for precluding an injector effect where the inlet pipe enters the inlet chamber sufficient to enable maximum tolerance to withstand greater supply fluctuations including a skimming disk with runoff apertures on the bottom thereof in the vicinity of the inlet chamber and fixed to the inlet pipe, the skimming disk positioned in the annular sapce to return centrifugate to the inlet chamber through the runoff apertures and the annular channel.

4,695,271

ANGIOGRAPHIC INJECTOR

James H. Goethel, Cincinnati, Ohio, assignor to Liebel-Flarsheim Company, Cincinnati, Ohio

Filed Feb. 3, 1986, Ser. No. 825,473

Int. Cl.[4] A61M *5/20*

U.S. Cl. 604—49 **9 Claims**

1. An apparatus having a powerhead for injecting a fluid into a living being comprising:

a. receptacle means mounted to said power head for receiving and holding a syringe cartridge having a movable plunger;

b. means mounted to said power head for moving said plunger along the longitudinal axis of said syringe cartridge;

c. means mounted to said power head for determining when said plunger had been fully extended; and

d. means associated with said power head for preventing operation of said power head in the injection mode until said plunger has been fully extended after said power head

has been powered up or when a new cartridge has been placed in said receptacle means.

4,695,272

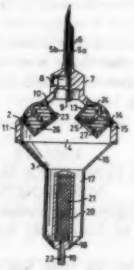
DRUG RELEASE DEVICE

Bengt G. Berglund, Göteborg; Karl-Erik L. Falk, Lindome; Dan A. Magnusson, Fjäras; Nils B. Nilson, Mjölby, and Ake S. Nilsson, Göteborg, all of Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden

Filed Apr. 23, 1985, Ser. No. 726,059

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—84 **13 Claims**



1. A drug release device for inclusion in a parenteral drug delivery system comprising a chamber having an outer wall, an inlet for a liquid administerable to a patient by a parenteral route and an outlet for liquid containing dissolved drug, the wall, inlet and outlet together defining a drug dissolution space within said chamber through which said liquid will flow during such parenteral delivery, and means for receiving and retaining within said drug dissolution space a drug preparation from which a drug is releaseable to said liquid during such parenteral delivery.

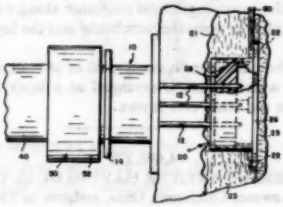
the improvement comprising providing one or more drug cells disposed on the outer wall of said chamber, each cell containing said drug preparation which is held isolated from the liquid by said cell, each of said drug cells having means for emptying its contents into said drug dissolution space.

4,695,273

MULTIPLE NEEDLE HOLDER AND SUBCUTANEOUS MULTIPLE CHANNEL INFUSION PORT

Eric W. Brown, Redondo Beach, Calif., assignor to I-Flow Corporation, Torrance, Calif.

Filed Apr. 8, 1986, Ser. No. 849,408
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—173 13 Claims



1. A multiple needle holder comprising:

a housing having a housing wall surrounding a plurality of conduits extending from a rear face on said housing to a front face;

a plurality of needles secured within said housing so that each of said needles is in communication with one of the said conduits, said needles extending outwards from the front face of said housing;

a plurality of engagement ports on the rear face of said housing each having an opening in communication with one of said conduits, said engagement ports being arranged so as to be matingly aligned with a plurality of ports on a multilumen catheter connector; and

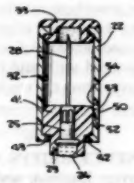
means extending outwardly from said housing wall for engaging a locking mechanism.

4,695,274

PROTECTED HYPODERMIC NEEDLE

Richard L. Fox, 1804 Rockefeller La., Redondo Beach, Calif. 90278

Filed Jan. 31, 1986, Ser. No. 824,879
Int. Cl.[4] A61M 5/32
U.S. Cl. 604—198 4 Claims



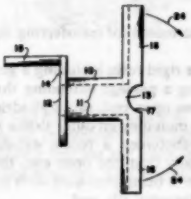
1. A disposable needle attachment for use with a syringe body assembly which has an expulsion end and a handle end, said needle attachment comprising a needle-holding member having at one end a recess of constructing configuration for releasable sealing engagement with the syringe body assembly at said expulsion end and a needle-holding end for the mounting of a hypodermic needle, a reltively closed safety jacket member having a needle-receiving pocket, a permeable closure at one end of the jacket member for alignment with a free end of the needle, the other end of the jacket member having a variable connection to the needle-holding member, said jacket member having a protective first position relative to the needle-holding member adapted to entirely contain the needle and a second position wherein said needle is adapted to be exposed through said permeable closure in a work position, said jacket member being turnable to said protective first position wherein said disposable needle attachment is removable from said body assembly for disposal.

4,695,275

MIDDLE EAR VENTILATION TUBE

Donald Bruce, 1723 Peachtree Cir. N., Jacksonville, Fla. 32207, and Richard L. Goode, 1583 Arbor, Los Altos, Calif. 94022

Continuation of Ser. No. 562,092, Dec. 16, 1983, abandoned.
This application Dec. 6, 1985, Ser. No. 806,091
Int. Cl.[4] A61M 5/325
U.S. Cl. 604—264 19 Claims



1. A myringotomy ventilation tube for insertion into an opening in a tympanic membrane to allow drainage from a middle ear to an outer ear, said tube comprising:

(a) a hollow tubular body having an outer surface and opposite end portions on opposite side walls of a tympanic membrane and a generally elongated uniform and straight passageway therethrough extending between said end portions and communicating between a middle ear and an outer ear;

(b) an outer flange secured to one of said end portions of said tubular body, said flange having an elongated substantially flat portion for contacting an outer wall of a tympanic membrane and inhibiting said tube from passing through an opening in an tympanic membrane and any contact of the other said end portion with a promotory in a back wall of as middle ear, said flange having a reduced portion substantially conforming to said outer surface of said tubular body for facilitating viewing of an opening in a tympanic membrane during insertion of said tube thereinto;

(c) a projection extending outwardly from said flange adjacent the free edge of said flange and adapted to be readily grasped by a removal instrument, said projection extending substantially parallel to and offset from the longitudinal axis of said passageway; and

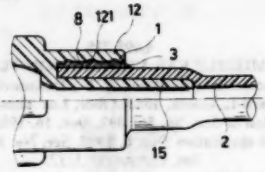
(d) a pair of spaced inner flexurally resilient elongated separate arms secured to said other end portion of said tubular body spaced from said outer flange and substantially parallel thereto and extending laterally in opposite directions from said body and generally perpendicular to said longitudinal axis, said arms being adapted to be temporarily squeezed together to substantially form a longitudinal extension of said body and having substantially the same diameter thereof and extending parallel to said longitudinal axis when being inserted into an opening in a tympanic membrane and to thereafter return to their opposite directions in perpendicular relationship with respect to said longitudinal axis to contact an inner wall of a tympanic membrane and inhibit inadvertent outward removal of said tube from its placement through an opening in a tympanic membrane.

4,695,276

MEDICAL INSTRUMENT

Kouji Shinno, Yamanashi, and Hitoshi Kuboki, Kofu, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 30, 1985, Ser. No. 792,741
Claims priority, application Japan, Nov. 6, 1984, 59-233769
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—283 **7 Claims**



1. A medical instrument for transferring liquid therethrough, comprising

a connector of a rigid resin including a generally cylindrical portion having a passage extending throughout the connector and one open end, said cylindrical portion at said one open end including an outer sleeve and an inner sleeve defining therebetween a recess extending circumferentially and axially from the open end, the inside surface of said outer sleeve being provided with at least one substantially circumferential rib, and

a tube of a flexible resin inserted into said recess and bonded thereto with an adhesive to define a continuous passage communicating said connector and said tube, characterized in that

said connector is formed of a rigid resin which is difficult to bond with a curable adhesive and having a Shore D hardness of at least 55,

said tube is formed of a flexible resin which is bondable with a curable adhesive and having a Shore D hardness of not higher than 45, and

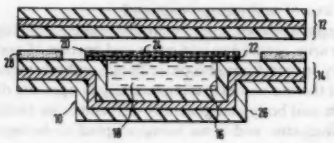
the joint portions of said connector and said tube are bonded with a ultraviolet curable adhesive which shows a Shore D hardness of at least 70 after curing.

4,695,277

PHARMACEUTICAL ADHESIVE PLASTER AND METHOD FOR MANUFACTURING IT

Willi Lauk, Schorndorf-Haubersbronn, Fed. Rep. of Germany, assignor to Allpack Industrielle Lohnverpackung GmbH & Co. KG, Fed. Rep. of Germany

Filed Aug. 16, 1985, Ser. No. 766,420
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430250; Apr. 2, 1985, 3511963
Int. Cl.[4] A61F *13/00*
U.S. Cl. 604—304 **1 Claim**



1. A pharmaceutical adhesive plaster comprising two parts jointed together, namely an active ingredient container comprising a composite film and having a shallow recess for containing the medicament, an innermost layer of thermoplastic synthetic resin in the form of a film, and an outer layer or adhesive which is at least one of pressure sensitive and sensitive to the heat of the skin and surrounds the recess in the form of a ring on the opening side of the recess; and a composite covering film comprising an innermost layer of thermoplastic synthetic resin in the form of a film, which is covered with the layer of adhesive and covers the recess of the active ingredient container;

wherein the recess of the active ingredient container is closed by a membrane which is permeable to the active ingredient and is firmly connected to the composite film of the active ingredient container concentrically within the outer layer of the adhesive; and in that the composite covering film is hermetically connected to the composite film of the active ingredient container along a ring extending radially between the membrane and the layer of adhesive;

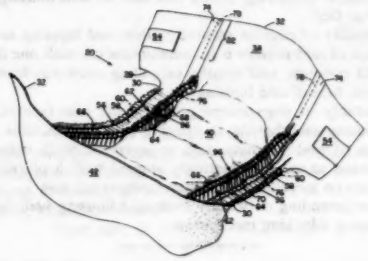
wherein the membrane is comprised of at least three layers, one of which layers is arranged as a layer of adhesive between the other two layers.

4,695,278

ABSORBENT ARTICLE HAVING DUAL CUFFS

Michael I. Lawson, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 11, 1985, Ser. No. 786,926
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 A **28 Claims**



1. An integral disposable absorbent article comprising:

a liquid pervious topsheet; a liquid impervious backsheet associated with said topsheet;

an absorbent core disposed between said topsheet and said backsheet;

an elastically contractible gasketing cuff disposed adjacent to an edge of the absorbent article;

a barrier cuff having a proximal edge and a distal edge, said barrier cuff disposed inboard of said gasketing cuff; and

spacing means associated with said barrier cuff for spacing said distal edge away from the top surface of said topsheet.

4,695,279

INCONTINENCE BRIEFS AND PANTS

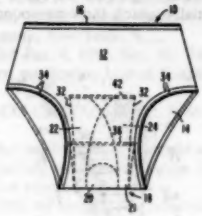
Graham E. Steer, Surrey, England, assignor to Craig Medical Products Limited, East Grinstead, England

Filed Apr. 18, 1986, Ser. No. 853,533
Claims priority, application United Kingdom, Apr. 29, 1985, 8510876; Jul. 16, 1985, 8517871; Aug. 22, 1985, 8521020
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—397 **6 Claims**

1. A pair of incontinence pants or briefs including a pocket located in the crotch region, the pocket defined by an outer wall of a liquid-impermeable material which is longer than it is wide and an inner wall of like material, the inner wall constructed of two pieces whose edges define a substantially oval hole, a portion of the one piece of the inner wall overlapping but not connected to a portion of the second piece of the inner wall, their edges being crossed over one another at one end of the pocket.

5. A pair of incontinence briefs or pants including a pocket located interiorly of the fabric of the crotch region, said pocket

having an inner wall and an outer wall both of liquid impermeable material, the pocket having an opening which extends



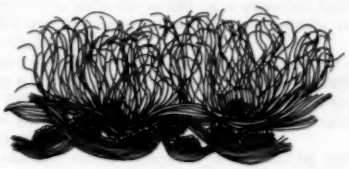
through its inner wall towards the body of the wearer when said briefs or pants are being worn, the edges of said opening being partly or wholly elasticated.

4,695,280

ARTIFICIAL VASCULAR GRAFT

Koji Watanabe, Otsu; Miyoshi Okamoto, Takatsuki; Yuichi Mori, Kamakura, and Yasuharu Noishiki, Tottori, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 617,048, Jun. 4, 1984, abandoned. This application Sep. 22, 1986, Ser. No. 910,330
Claims priority, application Japan, Jul. 6, 1983, 58-101321
Int. Cl.[4] A61F *2/06*
U.S. Cl. 623—1 **5 Claims**



1. An artificial vascular graft fabric consisting essentially of
(a) ultra-fine fibers of less than 0.5 denier, and
(b) conventional denier fibers of more than 1.0 denier, wherein said fibers are braided, woven or knit to form said artificial vascular graft fabric, whereby said artificial vascular graft fabric has at least a first inner surface and a second outer surface, said first inner surface consisting essentially of ultra-fine fibers.

4,695,281

MEDICAL MATERIAL

Teruo Miyata, Tokyo, and Yasuharu Noishiki, Tottori, both of Japan, assignors to Koken Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1983, Ser. No. 478,773
Int. Cl.[4] A61F *2/02, 2/06*
U.S. Cl. 623—11 **13 Claims**

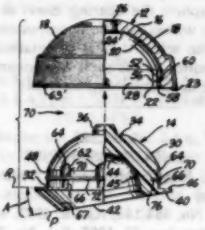
1. A medical material comprising collagen, the surface of the collagen being chemically modified by succinylation of terminal —NH_2 groups of side chains attached to polypeptide chains of the collagen, so that the —NH_2 groups on the surface of the collagen are converted to —COOH groups to a degree of at least 50%, based on the entire collagen; and the interior of the collagen being modified by crosslinking —NH_2 groups therein with one of an aldehyde and its analogous compound.

4,695,282

ACETABULAR CUP ASSEMBLY WITH SELECTIVE BEARING FACE ORIENTATION

Mark R. Forte, Pine Brook; Alex Khowaylo, Allendale, and Ewald Schloesser, Wayne, all of N.J., assignors to Osteonics Corp., Allendale, N.J.

Filed Jan. 23, 1986, Ser. No. 821,772
Int. Cl.[4] A61F *2/34*
U.S. Cl. 623—22 **16 Claims**



1. An acetabular cup assembly capable of being implanted in stages so as to enable preliminary ascertainment and adjustment of position during implant and prior to commitment to a completed implanted position, said acetabular cup assembly comprising:

a shell component having an outer surface for enabling permanent implant of the shell component at an implanted position, an upper top, a lower opening and an inner cavity extending into the shell component upwardly from the lower opening;

a bearing insert for placement within the cavity of the shell component by movement of the bearing insert in an axial direction into the cavity, the bearing insert being initially movable into a preliminary axial position within the shell component and subsequently movable axially upwardly beyond the preliminary axial position into a fully-seated axial position within the shell component, the bearing insert having a bearing face extending transverse to said axial direction;

an alignment and securing arrangement for aligning and securing the bearing insert within the shell component, said alignment and securing arrangement including first alignment and securing means carried by the shell component and second alignment and securing means carried by the bearing insert, the first and second alignment and securing means being generally complementary to one another for engagement when the bearing insert is in either of the preliminary and fully-seated axial positions;

the alignment and securing means including alignment and securing elements, the number and circumferential location of the alignment and securing elements being such that the bearing insert may be placed within the cavity in any selected one of a plurality of circumferential positions relative to the shell component for selective orientation of the bearing face relative to the shell component;

the alignment and securing elements including preliminary alignment means engagable upon placement of the bearing insert at the preliminary axial position for retaining the bearing insert at a preliminary circumferential position, relative to the shell component, wherein the bearing face is located at an initial selected orientation, the preliminary alignment means enabling holding of the bearing insert at the preliminary axial position for ascertainment of the circumferential position of the bearing insert and the concomitant orientation of the bearing face, and enabling selective withdrawal of the bearing insert from the preliminary axial position for circumferential repositioning of the bearing insert and concomitant reorientation of the bearing face to a selected final orientation corresponding

to a predetermined appropriate orientation, final alignment means engagable upon placement of the bearing insert at the fully-seated axial position for aligning the bearing insert at a final circumferential position, wherein the bearing face is at the selected final orientation, relative to the shell component, and locking means engagable in response to placement of the bearing insert at the fully-seated axial position for locking the bearing insert at the fully-seated axial position with a capturing force great enough to capture the bearing insert at the fully-seated axial position within the shell component, with the bearing face at the selected final orientation relative to the implanted position of the shell component, for permanent service in the acetabular cup assembly.

4,695,283

ENDOPROSTHESIS

Günther Aldinger, Engelfriedshalde 13, 7400 Tuebingen, Fed. Rep. of Germany

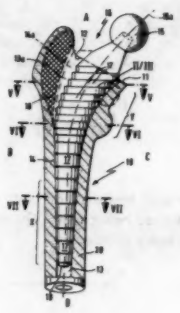
Division of Ser. No. 484,143, Apr. 8, 1983, abandoned. This application Jun. 27, 1985, Ser. No. 749,880

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1982, 3213437

Int. Cl.[4] **A61F** *2/30*

U.S. Cl. 623—23 **8 Claims**

1. An endoprothesis comprising an elongated shaft dimensioned to be anchored through a bone opening in a bone cavity, said shaft being formed in one piece having a shape composed by a plurality of individual disc-like segments of different shapes forming a tapered stepped profile without undercuts from a proximal end to a distal end of said shaft; said shapes of said individual disc-like segments having outer perimeters adjusted to substantially match the corresponding cross sections of the bone cavity in order said implanted shaft to be fitted snugly to the bone cavity at least in regions of said shaft in which a support of said implanted shaft to the bone takes place when said endoprothesis is loaded.



4,695,284

COOL WATER FABRIC WASHING PROCESS USING A PARTICULATE DETERGENT CONTAINING A NONIONIC AND A FATTY ACID BUILDER SALT

Andrew T. Hight, South Wirral, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Jun. 4, 1985, Ser. No. 741,042

Claims priority, application United Kingdom, Jun. 15, 1984, 8415302

Int. Cl.⁴ C11D *1/66, 9/22, 10/4, 11/02*

U.S. Cl. 8—137 **17 Claims**

1. A method for washing fabrics at cold water temperatures comprising contacting said fabrics below 5020 C. with built detergent particles comprising:

(i) from 5 to 50% by weight of a nonionic detergent active compound;

(ii) from 15 to 90% by weight of a saturated fatty acid builder salt containing at least 16 carbon atoms, or mixtures thereof; and

(iii) from 5 to 80% by weight of a carrier material, the carrier material being chosen from water-insoluble inorganic materials, water-soluble inorganic materials, water-soluble organic materials selected from the group consisting of urea, solid polyhydric alcohols, polysaccharides, synthetic polymers, proteins, and mixtures thereof; and

wherein said particles are prepared by distributing said nonionic active, said fatty acid builder salt, and said carrier material in water to form an aqueous solution and/or dispersion, mixing said combination, and evaporating water therefrom to obtain said built particles.

14. A method for washing fabrics at cold water temperatures comprising cntacting said fabrics below 50° C. with built detergent particles comprising:

(i) from 5 to 50% by weight of nonionic detergent active compound;

(ii) from 15 to 90% by weight of a saturated fatty acid builder salt containing at least 16 carbon atoms, or mixtures thereof; and

(ii) from 5 to 80% by weight of a carrier material, the carrier being a water-insoluble inorganic material selected from the following: naturally occurring silice, precipitated silica, silica gels, alumina and aluminosilicates, clays and mixtures thereof; and

wherein said particles are prepared by distributing said nonionic active, said fatty acid builder salt, and said carrier material in water to form an aqueous solution and/or dispersion, mixing said combination, and evaporating water therefrom to obtain said built particles.

4,695,285

PROCESS FOR COLORING KERATINACEOUS MATERIALS

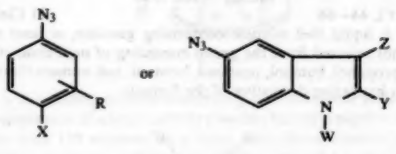
Alexander Chung-Bong-Chan, Mineola, N.Y., and Leszek J. Wolfram, Stamford, Conn., assignors to Clairol Incorporated, New York, N.Y.

Filed Oct. 15, 1986, Ser. No. 919,174

Int. Cl.⁴ A61K *7/13, 7/42;* **D06P** *5/20*

U.S. Cl. 8—429 **12 Claims**

1. A process for coloring keratinaceous material which comprises contacting said keratinaceous material with a coloring composition which contains an aromatic azide or azidoindole component having the formula



wherein X is hydroxyl, alkoxyl, NR'R", in which R' and R" are independently of each other hydrogen, alkyl or hydroxyalkyl, and if R' is H or alkyl, then R" can be further carbamylalkyl, mesylaminoalkyl, acylaminoalkyl, sulfoalkyl, piperidinoalkyl or morpholinoalkyl, R' and R" can also form with the nitrogen atom to which they are attached, a piperidine or morpholine ring, R is hydrogen, alkyl, hydroxyalkyl, halogen, nitro, cyano or alkoxyl, W, Y and Z are independently of each other H or R', wherein all of the aforementioned alkyl moieties can have between 1 and 8 carbon atoms, and then exposing the contacted keratinaceous material to a suitable light source for sufficient time to develop the color.

4,695,286

HIGH MOLECULAR WEIGHT POLYCARBONATE RECEIVING LAYER USED IN THERMAL DYE TRANSFER

Noel R. Vanier, Rochester, and Kin K. Lum, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 813,200, Dec. 24, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,551

Int. Cl.⁴ B41M *5/26*

U.S. Cl. 8—471 **13 Claims**

5. In a process of forming a dye transfer image comprising imagewise-heating a dye-donor element comprising a support having thereon a dye layer and transferring a dye image to a dye-receiving element to form said dye transfer image, said dye-receiving element comprising a support having thereon a polycarbonate dye image-receiving layer, the improvement wherein said polycarbonate has a number average molecular weight of at least about 25,000.

4,695,287

CYAN DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER

Steven Evans, Rochester, and Kin K. Lum, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 813,209, Dec. 24, 1985, abandoned. This application Sep. 26, 1986, Ser. No. 911,839

Int. Cl.⁴ B41M *5/26*

U.S. Cl. 8—471 **20 Claims**

11. In a process of forming a cyan dye transfer image comprising imagewise-heating a dye-donor element comprising a support bearing a dye layer comprising a cyan dye dispersed in a polymeric binder and transferring a cyan dye image to a dye-receiving element to form said cyan dye transfer image, the improvement wherein said cyan dye comprises a 2-carbamoyl-4-[N-(p-substituted aminoaryl)imino]-1,4-naphthoquinone.

4,695,288

SUBBING LAYER FOR DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER

Gerald L. Ducharme, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 7, 1986, Ser. No. 916,138

Int. Cl.⁴ B41M *5/26*

U.S. Cl. 8—471 **18 Claims**

8. In a process of forming a dye transfer image comprising

(a) imagewise-heating a dye-donor element comprising a poly(ethylene terephthalate) support having thereon, in order, a subbing layer and a dye layer comprising a dye dispersed in a cellulosic binder, and

(b) transferring a dye image to a dye-receiving element to form said dye transfer image,

the improvement wherein said subbing layer comprises from about 5 to about 35 percent by weight of recurring units of an ethylenically unsaturated monomer, from about 0 to about 20 percent by weight of recurring units of an ethylenically unsaturated carboxylic acid, and from about 55 to about 85 percent by weight of recurring units of vinylidene chloride, said subbing layer providing increased adhesion between said support and said dye layer.

4,695,289

PROCESS FOR IMPROVING THE COLOUR YIELD AND WETFASTNESS PROPERTIES OF DYEINGS OR PRINTS PRODUCED ON CELLULOSIC FABRICS WITH ANIONIC DYES: TREATMENT WITH CATIONIC IMIDAZOLE

Rosemarie Töpfl, Dornach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 4, 1985, Ser. No. 794,935

Claims priority, application Switzerland, Nov. 5, 1984, 5285/84

Int. Cl.[4] D06P *1/64, 3/60;* C07D *233/60;* D06B *1/14*

U.S. Cl. 8—573 19 Claims

1. A process for improving the colour yield and wetfastness properties of dyeings or prints produced on cellulosic materials with anionic dyes, which process comprises treating the cellulosic materials before, during or after dyeing with a cationic fiber-reactive compound which is the reaction product of an imidazole compound containing in 2-position an aliphatic radical of not less than 7 carbon atoms or phenyl, and an epihalohydrin.

4,695,290

INTEGRATED COAL CLEANING PROCESS WITH MIXED ACID REGENERATION

James K. Kindig, Boulder, and James E. Reynolds, Golden, both of Colo., assignors to Integrated Carbons Corporation, Tulsa, Okla.

Continuation-in-part of Ser. No. 517,338, Jul. 26, 1983, abandoned, and a continuation-in-part of Ser. No. 517,339, Jul. 26, 1983, abandoned, and a continuation-in-part of Ser. No. 517,340, Jul. 26, 1983, abandoned, and a continuation-in-part of Ser. No. 517,362, Jul. 26, 1983, abandoned. This application Jun. 24, 1985, Ser. No. 748,236

Int. Cl.[4] C10L *9/02, 9/06*

U.S. Cl. 44—1 S R 40 Claims

3. A method of producing a coal product from coal and coal derivatives, said coal product having a mineral matter content of less than about 5 percent by weight comprising the steps of:

(a) contacting coal of a size less than about one inch with a mixed acid leach liquor comprising less than about 70 weight percent hydrofluoric acid and less than about 38 weight percent hydrochloric acid at atmospheric pressure and at a temperature below the boiling point of the acid mixture to produce a leached coal and a spent acid liquor comprising at least one metal halide wherein said metal halide will pyrohydrolyze to its metal oxide at a temperature below about 1200° C. and at atmospheric pressure and at least one metal halide that will not pyrohydrolyze to metal oxide at said temperature and pressure, but will sulfate to form its metal sulfate at said temperature and pressure, and wherein said halide is selected from the group consisting of fluoride and chloride;

(b) separating said spent mixed acid leach liquor and said leached coal;

(c) contacting said spent mixed acid leach liquor with a hot gas comprising water vapor in the presence of SO_2 and excess oxygen at a temperature of from about 600° C. to about 1100° C. to regenerate HF and HCl from substantially all of the metal halide salts present and to form the respective metal sulfates and oxides;

(d) separating said HF and HCl as part of hot off-gas produced in step (c) from the oxide/sulfate-containing calcine formed in step (c);

(e) recycling said regenerated HF and HCl mixed acids to mixed acid leach of step (a); and

(f) removing pyrite from said leached coal to produce a coal product substantially free of pyrite.

4,695,291

POLY(OXYALKYLENE) AMINOETHER CARBAMATES AS DEPOSIT CONTROL ADDITIVES

Frank Plavac, Pinole, Calif., assignor to Chevron Research Company, San Francisco, Calif.

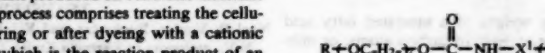
Continuation of Ser. No. 429,695, Sep. 30, 1982, Pat. No. 4,521,610. This application Feb. 15, 1985, Ser. No. 701,849

The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.

Int. Cl.[4] A01M *23/10*

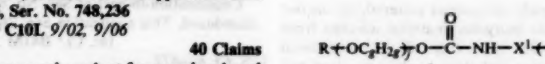
U.S. Cl. 44—62 16 Claims

1. A fuel composition comprising a major portion of hydrocarbon boiling in the gasoline range and from 30 to 2,000 ppm of an additive having the formula:



wherein n is an integer from 1 to 10; g is an integer from 2 to 5; j is an integer such that the molecular weight of the compound is in the range of about 500 to 10,000; R is a hydrocarbyl group of from about 1 to 30 carbon atoms; and X^1 and X^2 are the same or different substituents selected from the group consisting of (A) alkylene groups containing 1 to 6 carbon atoms; (B) arylene groups of from 6 to 12 carbon atoms; and (C) groups selected from (A) and (B) and substituted with groups selected from hydroxyl, alkoxyl, nitrile, amino, and alkyl and/or aryl groups substituted with substituents selected from hydroxyl, alkoxyl, nitrile, amino groups; and wherein X^2 can vary independently within the groups consisting of (A), (B) and (C) up to n times.

9. A fuel concentrate comprising an inert stable oleophilic organic solvent boiling in the range of from 150° to 400° F. and from 10 to 50 weight percent of a fuel additive of the formula:



wherein n is an integer from 1 to 10; g is an integer from 2 to 5; j is an integer such that the molecular weight of the compound is in the range of about 500 to 10,000; R is a hydrocarbyl group of from about 1 to 30 atoms; and X^1 and X^2 are the same or different substituents selected from the group consisting of (A) alkylene groups containing 1 to 6 carbon atoms; (B) arylene groups of from 6 to 12 carbon atoms; and (C) groups selected from (A) and (B) and substituted with groups selected from hyrdoxyl, alkoxyl, nitrile, amino, and alkyl and/or aryl groups substituted with substituents selected from hydroxyl, alkoxyl, nitrile, amino groups; and wherein X^2 can vary independently within the groups consisting of (A), (B) and (C) up to n times.

4,695,292

MOTOR FUEL COMPOSITIONS AND METHODS

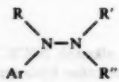
Hans Osborg, P.O. Box 152, 80 Long View Rd., Port Washington, N.Y. 11050

Continuation-in-part of Ser. No. 503,396, Jun. 10, 1983, abandoned. This application Aug. 11, 1983, Ser. No. 522,548

Int. Cl.[4] C10L *1/22*

U.S. Cl. 44—64 11 Claims

1. A liquid fuel mixture comprising gasoline, at least one alcohol selected from the group consisting of methanol, ethanol, propanol, butanol, pentanol, hexanol, and isomers thereof, and a hydrazine derivative of the formula:



wherein Ar represents a radical selected from the group consisting of aryl having 6 to 15 carbon atoms or aralkyl having 7 to 15 carbon atoms, R, R′ and R″ may be the same or different and represent hydrogen or a racical selected from the group consisting of alkyl having 1 to 10 carbon atoms, cycloalkyl having 3 to 8 carbon atoms or Ar, as herein defined, and at least one of said R, R′, and R″ is hydrogen, said mixture being homogeneous at ambient temperatures, and the composition of said mixture comprising, by weight, from about 50% to about 95% gasoline, from about 4.75% about 49.75% alcohol and from about 0.25% to about 5.0% hydrazine derivative.

11. The mixture of claim **1**, which further includes a compatible Lewis base, selected from ammonia, a mono-, di- or trialkylamine, or a mixture thereof.

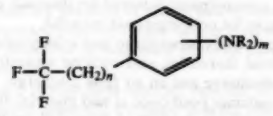
4,695,293

FUEL ADDITIVE

Saul Kessler, 7020 Rivol Rd., Canoga Park, Calif. 91307

Filed Sep. 20, 1985, Ser. No. 773,662
Int. Cl.[4] C10L *1/20*
U.S. Cl. 44—68 **17 Claims**

1. An additive for a liquid hydrocarbon fuel comprising a solution in a combustible organic diluent of about 0.0001 to 10 percent by weight of a soluble compound comprising the reaction product of a halide salt selected from the group consisting of boron halides, titanium halides or aluminum halides with a haloalkyl-arylamine of the formula:



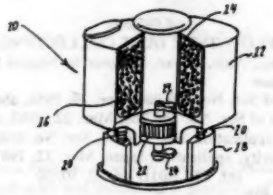
where n is an integer from 0 to 4, m is an integer from 1 to 2 and R is selected from hydrogen, lower alkyl of 1 to 9 carbon atoms, lower alkanol of 1 to 8 carbon atoms, aryl or aralkyl.

4,695,294

VIBRATORY GRINDING OF SILICON CARBIDE

Tadeusz M. Korzekwa, Lewiston; Carl H. McMurtry, Youngstown, and Wolfgang D. G. Boecker, Lewiston, all of N.Y., assignors to Stemcor Corporation, Cleveland, Ohio

Filed Apr. 11, 1985, Ser. No. 722,272
Int. Cl.[4] B24D *3/02*
U.S. Cl. 51—307 **20 Claims**



1. A grinding mixture comprising silicon carbide pellets and a suspension of silicon carbide powder, having a particle size of less than 150 microns, in a fluid, said silicon carbide pellets having a maximum dimension of from about 0.5 to 5 centimeters, at least 90 percent of the pellets having a density greater than 3.05 g/cm^3.

4,695,295

GAS SEPARATION MEMBRANES FROM POLYMERS CONTAINING A HYDROCARBON BACKBONE AND PENDANT (HYDROCARBYLAMIDO)ALKYL ESTER MOIETIES

Linneaus C. Dorman; Victor E. Meyer, both of Midland, Mich., and Marinda L. Wu, San Ramon, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 24, 1986, Ser. No. 911,275
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 **16 Claims**

1. A gas separation membrane comprising a semipermeable membrane fabricated from a polymer containing a hydrocarbon backbone and pendant (hydrocarbylamido)alkyl ester moieties.

7. A method of separating gases comprising the steps of

(a) contacting with a feed gas mixture under pressure one side of a semipermeable membrane comprising a membrane fabricated from a polymer containing a hydrocarbon backbone and pendant (hydrocarbylamido)alkyl ester moieties;

(b) maintaining a pressure differential across the membrane under conditions such that a component(s) of the feed gas mixture selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane,

(c) removing the permeated gas which is enriched in the faster permeating component(s) from the low pressure side of the membrane; and

(d) removing the nonpermeated gas which is depleted in the faster permeating component(s) from the high pressure side of the membrane.

4,695,296

METHOD FOR THE SELECTIVE SEPARATION OF GASES

Karl O. Christe, Calabasas, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 31, 1985, Ser. No. 739,806
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—68 **10 Claims**

1. A method for the selective removal of an oxide of carbon from a gas stream containing the same and an elemental halogen comprising: bringing the gas stream to be treated into contact with a water-free, molecular sieve which has been prehalogenated with elemental halogen whereby the oxide of carbon is selectively retained in the molecular sieve.

9. A method for the selective removal of CO_2 from a gas stream containing the same and fluorine comprising passing the gas stream through a bed of pellets consisting of an aluminosilicate having a pore size of at least about 4 angstroms which has been prefluorinated with elemental fluorine.

4,695,297

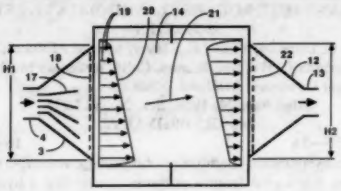
ELECTROSTATIC PRECIPITATOR

Arthur G. Hein, 5274 Cliffridge Avenue, North Vancouver, British Columbia, Canada (V7R 3V4)

Continuation-in-part of Ser. No. 714,469, Mar. 26, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 943,855
Int. Cl.[4] B03C *3/36*
U.S. Cl. 55—112 **2 Claims**

1. In a dry horizontal flow electrostatic precipitator for removing suspended particles from a gas stream, the precipitator having a casing, a treatment zone consisting of collecting and high voltage electrodes, rapping means to dislodge the collected dust, an inlet opening at one end of the treatment zone for admitting the untreated gas stream and an outlet opening at the other end of the treatment zone for discharging the treated gas stream, the improvement comprising gas flow

control means at or near the inlet opening designed for non-uniform gas distribution, such that more than half the gas flow



entering the treatment zone enters the lower half of the height of the opening to the treatment zone.

4,695,298

APPARATUS FOR CLEANING SOLIDS-LADEN GAS

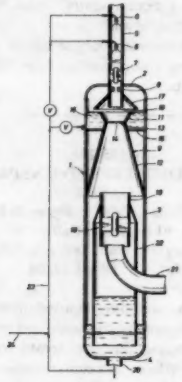
Hubertus W. A. A. Dries, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 1, 1983, Ser. No. 547,690

Claims priority, application United Kingdom, Nov. 1, 1982, 8231168

Int. Cl.[4] B01D *47/06, 47/10, 47/12*

U.S. Cl. 55—223 **2 Claims**



1. An apparatus for cleaning a solids-laden gas comprising a vertically-extending vessel with a solids-laden gas supply conduit communicating therewith and substantially vertically-extending into the top-portion of the vessel, said supply conduit being provided with means for introducing a fluid therein; first means in said supply conduit for imparting a rotary motion to a gas/liquid mixture in said conduit to separate liquid from gas; means for laterally discharging separated liquid from the supply conduit into the vessel; said vessel also being internally provided with a venturi-shaped gas passage member communicating at its entrance with and substantially coaxially aligned with the supply conduit; means for guiding liquid, from said means for lateral discharge of separated liquid, into a means for liquid collection; means substantially surrounding at least the upper part of the venturi-shaped gas passage member forming therewith and with the walls of the vessel said means for liquid collection, and further forming with said gas passage member means for guiding liquid from said means for liquid collection into the throat of the venturi-shaped gas passage member at or above the throat thereof; second means for imparting a rotary motion to a gas/liquid mixture to separate liquid with solids from gas, said second means being aligned with and communicating with the discharge end of said venturi-shaped passage member in said vessel; means for discharging liquid with solids from said vessel; and means for discharging gas from the vessel.

4,695,299

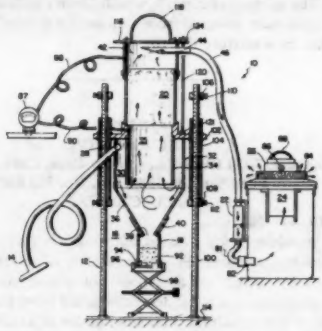
METHOD AND APPARATUS FOR IN-CELL VACUUMING OF RADIOLOGICALLY CONTAMINATED MATERIALS

Peter R. Spadaro; Jay E. Smith, both of Pittsburgh; Elmer L. Speer, Ruffsdale, and Arnold L. Cecconi, Clairton, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 21, 1986, Ser. No. 831,744

Int. Cl.[4] B01D *45/12*

U.S. Cl. 55—274 **15 Claims**



5. A vacuum system having a vacuum source for collecting radiologically contaminated material for disposal, comprising:

an inlet nozzle for collecting said material;

a cyclone separator connected to said inlet nozzle to receive said material therefrom, said cyclone separator having a material discharge and an air flow discharge;

a product container positioned at said material discharge for receiving material discharged from said cyclone separator, said product container is transparent for allowing observation of a level of material collected therein;

a first prefilter downstream of said air flow discharge for filtering air from said air flow discharge;

a second prefilter connected between said vacuum source and said first prefilter for filtering air from said first prefilter, said second prefilter having means for visually observing the air flow in said second prefilter;

means for monitoring a pressure drop across said first prefilter; and

means for supporting said product container against said material discharge during operation and for facilitating removal of said product container from said material discharge for disposal of said material.

4,695,300

RADIAL FLOW TYPE DUST COLLECTING FILTER

Shigeru Takagi, Anjo, Japan, assignor to Nippon Soken, Inc., Nishio, Japan

Division of Ser. No. 605,980, Apr. 20, 1984, abandoned, continuation of Ser. No. 360,768, Mar. 22, 1982, abandoned. This application Jan. 7, 1986, Ser. No. 816,977

Claims priority, application Japan, Mar. 22, 1981, 56-41242

Int. Cl.[4] B01D *46/52, 50/00*

U.S. Cl. 55—485 **5 Claims**

1. A radial flow type dust collecting filter provided with a cylindrical filtering wall of substantially constant radial thickness for filtering fluid flowing in the radial inward direction of said filtering wall, comprising:

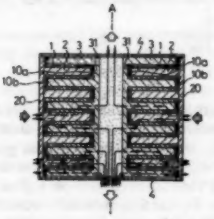
a thin walled first filter member of generally cylindrical shape and having a generally zig-zag or corrugated configuration in longitudinal section to define circumferentially-extending inwardly-facing and outwardly-facing ridges separated by inwardly-facing and outwardly-facing

valley-like spaces, said ridges having end portions connected to main portions of said first filter member;

a second filter member which is disposed within and completely fills the outwardly-facing spaces defined by said first filter member;

a third filter member which is disposed within and completely fills the inwardly-facing spaces defined by said first filter member, which interiorly covers said first filter member and which has a cylindrical interior surface defining an axially extending through hole in the center thereof; and

a pair of end plates which are fixed to both axial ends of said first and third filter members, respectively, for retaining said filter members therebetween,



at least one of said end plates having a central hole in communication with said through hole,

at least said end portions of one of said inwardly-facing and said outwardly-facing ridges having a flowing resistance larger than that of said main portions of said first filter member, and

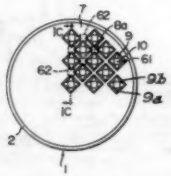
each of said second filter member and said third filter member having generally the same flowing resistance smaller than that of said main portions of said first filter member for collecting dust primarily by impaction.

4,695,301

POROUS CERAMIC MONOLITHS

Atushi Okajima, Kariya; Hitoshi Yoshida, Okazaki; Yukihisa Takeuchi, Aichi, and Masanori Fukutani, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Feb. 10, 1986, Ser. No. 827,718
Claims priority, application Japan, Feb. 11, 1985, 60-24994
Int. Cl.⁴ B01D *39/20*; C04B *21/06*
U.S. Cl. 55—523 **11 Claims**



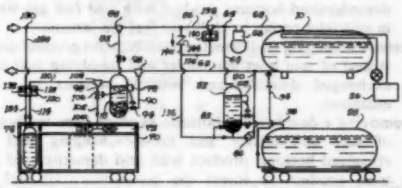
1. A porous ceramic monolith having an inlet end wall and an outlet end wall and including a plurality of bores having substantially parallel axes and separated from each other by porous partition walls, some of said bores being closed by said inlet end wall and opened in an outer end face of said outlet end wall to provide outlet bores and the other of said bores being closed by said outlet end wall of said ceramic monolith and opened in an outer end face of said inlet end wall to provide inlet bores, said inlet and outlet bores being interlaced such that a flow of fluid entering said inlet bores is allowed to pass through the pores in said partition walls into said outlet bores, wherein the open ends of at least said inlet bores are diverged outwardly and wherein each of said end walls has a first thickness measured in the axial direction of said bores and each of said partition walls has a second thickness measured in a direction perpendicular to the axes of said bores, said first thickness being greater than said second thickness.

4,695,302

PRODUCTION OF LARGE QUANTITIES OF CO_2 SNOW

Lewis Tyree, Jr., North Oak Brook, Ill., assignor to Liquid Carbonic Corporation, Chicago, Ill.

Filed Oct. 28, 1986, Ser. No. 923,908
Int. Cl.⁴ F25J *1/00*
U.S. Cl. 62—10 **18 Claims**



1. A method for efficiently providing large quantities of CO_2 snow, which method comprises the steps of:

maintaining a reservoir of at least about 2,000 pounds of solid CO_2 at about its triple point containing a substantial portion of solid CO_2,

connecting a source of high pressure liquid CO_2 to a first region of said reservoir,

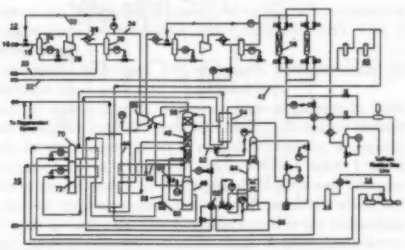
connecting a second region of said reservoir to a receptacle for receiving a large quantity of CO_2 snow and causing the flow of high pressure liquid CO_2 through said reservoir while deterring the exit passage of solid CO_2, whereby high pressure CO_2 flows through said reservoir when it is subcooled by contact with solid CO_2 therein, and expanding said subcooled CO_2 at the receptacle to create solid CO_2 and CO_2 vapor.

4,695,303

METHOD FOR RECOVERY OF NATURAL GAS LIQUIDS

George J. Montgomery, IV, Houston, and Hafez K. Aghili, Katy, both of Tex., assignors to McDermott International, Inc., New Orleans, La.

Filed Jul. 8, 1986, Ser. No. 883,210
Int. Cl.⁴ F25J *3/02*
U.S. Cl. 62—24 **6 Claims**



1. A method for recovering natural gas liquids from a fuel gas stream with high hydrogen and carbon dioxide content comprising the steps of:

dehydrating said fuel gas stream;

compressing said fuel gas stream to a pressure of generally 300 psi;

chilling said fuel gas stream in an inlet gas cooler to generally −45° F.;

separating said chilled, compressed fuel gas stream into a predominently liquid stream and a predominantly vapor stream;

separately reducing the pressure of said liquid and said vapor streams and supplying said separated streams to a demethanizer;

raising the temperature of said vapor stream prior to supplying it to said demethanizer;

removing cold demethanized residue gas from the top of said demethanizer and cross exchanging said residue gas with said fuel gas stream in said inlet gas cooler to chill said fuel gas stream;

removing cold demethanized bottoms product from the bottom of said demethanizer and cross exchanging said demethanized bottoms product with said fuel gas stream in said inlet cooler to chill said fuel gas stream;

cross exchanging said demethanized bottoms product downstream of said inlet gas cooler and supplying said cross exchanged demethanized bottoms product to a de-ethanizer;

removing a de-ethanized bottoms product from the bottom of said de-ethanizer and cross-exchanging said de-ethanized bottoms product with said demethanized bottoms product to lower the temperature of said de-ethanized bottoms product and raise the temperature of said demethanized bottoms product prior to supplying said demethanized bottoms product to said de-ethanizer;

removing a de-ethanized overhead product from the top of said de-ethanizer and cross exchanging said de-ethanized overhead product with said vapor streams to lower the temperature of said de-ethanized overhead product and raise the temperature of said vapor stream prior to supplying both to said demethanizer; and,

scrubbing said fuel gas stream prior to chilling said stream in said inlet gas cooler.

4,695,304

SEPARATION OF CO_2 FROM A GASEOUS MIXTURE

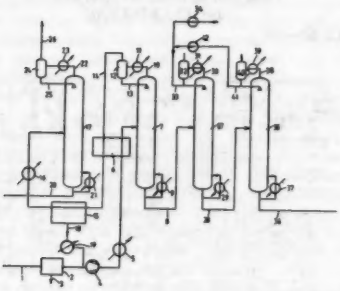
Rainer Sapper, Neuried, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Jun. 12, 1985, Ser. No. 743,727

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3422158; May 3, 1985, 3515949

Int. Cl.[4] F24J 3/02

U.S. Cl. 62—27 **27 Claims**



1. A process for the separation of CO_2 from a gaseous mixture containing CO_2 and at least C_1–C_2 hydrocarbons, said process comprising separating said gaseous mixture in a first fractionating stage into an overhead fraction containing substantially all the C_1 and C_2 hydrocarbons and a minor portion of the CO_2 and into a bottoms fraction containing the major portion of the CO_2.

4,695,305

METHOD OF FOR MANUFACTURING GLASS BODIES

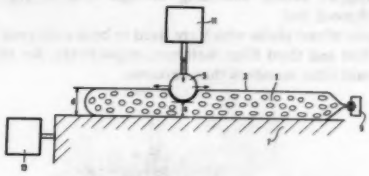
Rolf Clasen, Aachen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,407

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511454

Int. Cl.[4] C03B 37/023; C03C 4/00

U.S. Cl. 65—18.3 **13 Claims**



1. In a method of manufacturing glass bodies, in which method a thixotropic suspension, the starting material for the glass body, is used to form a porous green body which is subsequently subjected to a purification step in a heated gaseous phase and then sintered to form a glass body, the improvement wherein the starting material is placed in an elastic mold, is subjected to mechanical forces applied to the external surface of said elastic mold while in the elastic mold whereby it is homogenized and liquefied in the elastic mould and is subsequently freed of the influence of said mechanical forces, as a result of which the starting material solidifies again to form a green body.

4,695,306

AUTOMATIC MACHINE FOR WELDING TWO OPTICAL FIBERS END-TO-END

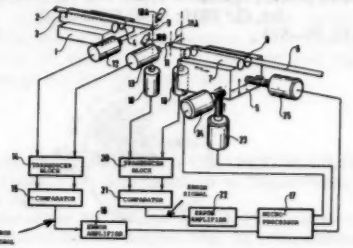
Roland Hakoun, Paris, and Michel Jurczyszyn, Ivry Sur Seine, both of France, assignors to Optiques Compagnie Lyonnaise de Tranmissions, Clichy, France

Continuation of Ser. No. 664,445, Oct. 24, 1984, abandoned. This application Feb. 10, 1986, Ser. No. 828,089

Claims priority, application France, Oct. 24, 1983, 83 16889; Apr. 20, 1984, 84 06300

Int. Cl.[4] C03B 9/42, 23/20

U.S. Cl. 65—152 **12 Claims**



1. In an automatic machine for welding optical fibers end-to-end, said machine comprising:

first and second optical support plates respectively for supporting a first "reference" optical fiber and a second, "moving" optical fiber in end facing general axial alignment;

automatic translation means connected to said second support plate for moving said second support plate in two orthogonal directions which are perpendicular to the axes of the fibers;

automatic translation means connected to one of said support plates for moving said support plate parallel to the axes of the fibers;

manual translation means connected to the other of said support plates for moving said other support plate parallel to the axes of the fibers;

position detecting means comprising light source means for illuminating the ends of the optical fibers; optical lens means for forming magnified images thereof; and optical pick-up means for sensing the positions of said images and for generating signals responsive to sensed positions of said images;

control means responsive to said signals derived from said optical pick-up means and connected to said automatic translation means to effect control thereof; and

fiber welding means for welding together the ends of said optical fibers;

the improvement wherein said light source means comprises means illuminating the ends of said optical fibers in a plane perpendicular to the axes of said optical fibers, and said pick-up means comprises means for detecting the position of each fiber end in two orthogonal directions corresponding to said orthogonal directions perpendicular to the axes of the fibers, said pick-up means comprising at least two optical pick-ups for each fiber end and at least one optical pick-up for each of said orthogonal directions, optical transducers connected to respective optical pick-ups for converting said optical signals into respective electrical signals, and means connecting electronic comparators to said transducers so that, for each of said orthogonal directions, the electrical signals derived from the pick-ups associated with different optical fiber ends are electronically compared, and means connecting said comparators to said control means for feeding electrical signals resulting from said comparisons representing misalignment of said optical fibers in respective orthogonal directions perpendicular to said axes of said optical fibers to said control means to enable said control means to control said automatic translation means to bring said fiber ends within one-tenth of a micron degree of axial alignment, and into end-to-end contact ready to be welded together;

and wherein said light source means comprises a separate light source for each of said two orthogonal directions, each of said separate light sources is located on one side of the fiber ends, said lens means comprise separate lens means located on the other side of the fiber ends opposite said separate light sources, respectively, for forming magnified real images of the optical fiber ends and respective optical pick-ups are located at said magnified real images.

4,695,307

BAFFLE MOVING MECHANISM FOR USE IN A GLASSWARE MANUFACTURING MACHINE OF THE INDIVIDUAL SECTION TYPE

Hermann H. Nebelung, Zurich, Switzerland, assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Jul. 17, 1986, Ser. No. 887,145

Claims priority, application United Kingdom, Jul. 24, 1985, 8518717

Int. Cl.⁴ C03B *9/335*

U.S. Cl. 65—242 **2 Claims**

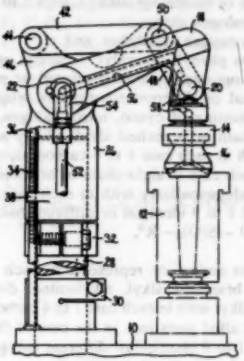
1. A glassware manufacturing machine of the individual section type comprising:

a mold,

a baffle,

parallelogram linkage means for supporting said baffle and for displacing said baffle from an operative to a remote position without changing its orientation, said parallelogram linkage means including

first conduit means for directing air under pressure to said baffle,



said baffle including second conduit means continuously communicating with said first conduit means.

4,695,308

HERBICIDAL SUBSTITUTED 5-AMINO-1-ARYL-PYRAZOLES

Reinhold Gehring, Wuppertal; Markus Lindig, Hilden; Otto Schallner, Monheim; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Jörg Stetter, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

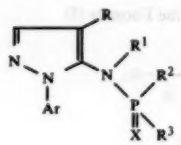
Filed Oct. 30, 1986, Ser. No. 925,845

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1985, 3539844

Int. Cl.⁴ A01N *57/32;* **C07F** *9/65*

U.S. Cl. 71—86 **8 Claims**

1. A substituted 5-amino-1-arylpyrazole of the formula



in which

R represents hydrogen, cyano or nitro, or represents straight-chain or branched alkoxycarbonyl with 1 to 4 carbon atoms,

R^1 represents hydrogen, or represents straight-chain or branched alkyl with 1 to 6 carbon atoms,

R^2 and R^3 independently of one another represent in each case straight-chain or branched alkyl, alkenyl or alkinyl with in each case up to 8 carbon atoms, or represent straight-chain or branched halogenoalkyl with 1 to 6 carbon atoms and 1 to 13 identical or different halogen atoms, or represent straight-chain or branched alkoxyalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts, or represent straight-chain or branched alkoxy with 1 to 6 carbon atoms, or represent cycloalkyl or cycloalkyloxy with in each case 3 to 7 carbon atoms, or represent aryl, aryloxy, aralkyl or aralkyloxy with in each case 6 to 10 carbon atoms in the individual aryl parts and, where appropriate, one to three carbon atoms in the straight-chain or branched alkyl parts, in each case optionally monosubstituted or polysubstituted in the aryl part by identical or different substituents selected from the group

consisting of halogen, cyano, nitro and in each case straight-chain or branched alkyl, alkoxy, alkylthio or halogenoalkyl with in each case 1 to 4 carbon atoms and, in the case of the halogenoalkyl, with 1 to 9 identical or different halogen atoms,

X represents oxygen or sulphur, and

Ar represents phenyl, 2-pyridyl, 3-pyridyl or 4-pyridyl, in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of cyano, nitro, halogen, in each case straight-chain or branched alkyl, alkoxy and alkoxycarbonyl with in each case 1 to 4 carbon atoms in the alkyl part, in each case straight-chain or branched halogenoalkyl and halogenoalkoxy with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms or the radical $-S(O)_n-R^4$,

wherein

R^4 represents amino, or represents in each case straight-chain or branched alkyl, alkylamino, dialkylamino or halogenoalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts and, in the case of the halogenoalkyl, with 1 to 9 identical or different halogen atoms, and

n represents the number 0, 1 or 2,

or a salt thereof.

6. A herbicidal composition comprising a herbicidally effective amount of a compound or salt according to claim 1 and a diluent.

4,695,309

COMPOSITION FOR PROLONGING THE ACTION OF HERBICIDES AND HERBICIDE COMPOSITIONS WITH A PROLONGED ACTION

Barna Bordás; Antal Gimesi; Magda Kovács, née Kálmán; Éva János; György Matolcsy, and Márton Tüske, all of Budapest, Hungary, assignors to Eszakmagyarorszagi Vegyimuvek, Sajobabony, Hungary

Division of Ser. No. 744,513, Jun. 13, 1985. This application Mar. 17, 1986, Ser. No. 840,425

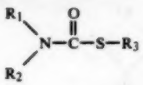
Claims priority, application Hungary, Jun. 14, 1984, 2306/84

Int. Cl.[4] A01N *25/22*

U.S. Cl. 71—88 **14 Claims**

1. A composition with prolonged herbicidal activity which comprises:

(a) a herbicidal compound of the Formula (I)

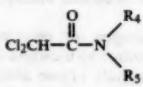


wherein

R_1, R_2 and R_3 are each C_1 to C_4 alkyl; or

R_1 and R_2 are each C_4 to C_6 cycloalkyl;

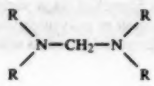
(b) an antidotal compound of the Formula (II)



wherein

R_4 and R_5 are each C_2 to C_4 alkenyl, a (C_1 to C_4 alkoxy)-(C_1 to C_4 alkoxy-(C_1 to C_4 alkyl) group, or a (C_2 to C_4 alkenyl)-aminocarbonyl-(C_1 to C_4 akyl) group; or R_4 and R_5 together with the adjacent nitrogen atom may represent a saturated ring consisting of 4 to 7 members optionally broken by an oxygen atom and optionally substituted at most by three methyl groups or C_4 to C_6 cycloalkyl groups; and

(c) an extender compound of the Formula (III)



wherein the

R substituents are each independently C_1 to C_6 alkyl or C_2 to C_4 alkenyl each unsubstituted or substituted by a C_1 to C_4 alkyl group, wherein at least two of the R substituents are each allyl and wherein the weight ratio between the herbicidal compound of the formula (I) to the extender compound of the formula (III) is 25:1 to 1:1.

4,695,310

BENZOFURAN AND BENZOTHIOPHENE SULFONAMIDES

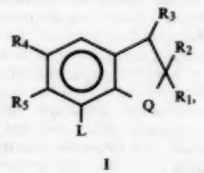
Morris P. Rorer, Newark, Del., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Division of Ser. No. 706,961, Mar. 6, 1985, Pat. No. 4,589,909, which is a continuation-in-part of Ser. No. 617,608, Jun. 5, 1984, abandoned. This application Jan. 23, 1986, Ser. No. 824,368

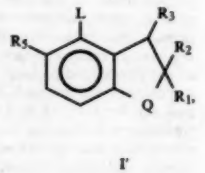
Int. Cl.[4] C07D *405/12, 409/12;* A01N *43/54*

U.S. Cl. 71—90 **22 Claims**

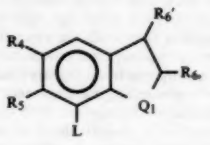
1. A compound selected from:



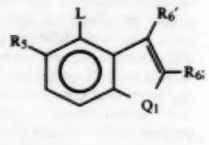
I



I'



II



II'

wherein

Q is O, S, SO or SO_2;

Q_1 is O, S or SO_2;

L is

R_1 is H or C_1–C_4 alkyl;

R_2 is H or C_1–C_4 alkyl;

R_3 is H or CH_3;

R_4 is H, Cl, CH_3, CF_3, OCH_3, Br, F, SCH_3 or OCF_2H;

R_5 is H, CH_3, OCH_3, Cl, Br, NO_2, CO_2R_7, SO_2R_8, OSO_2R_9, $SO_2NR_{10}R_{11}$, F, CF_3, SCH_3, OCF_2H or $SO_2N(OCH_3)CH_3$;

R_6 is H, Cl, Br or C_1–C_4 alkyl;

R_6' is H, CH_3, Cl or Br;

R_7 is C_1–C_3 alkyl, $CH_2CH{=}CH_2$, $CH_2CH_2OCH_3$ or CH_2CH_2Cl;

R_8 is C_1–C_3 alkyl;

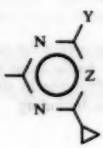
R_9 is C_1–C_3 alkyl or CF_3;

R_{10} and R_{11} are independently C_1–C_2 alkyl;

R_{12} is H or CH_3;

W is O or S;

A is



Y is C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkoxylmethyl, OCF_2H, SCF_2H, OCH_2CF_3, OCH_2CH_2F, CF_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $NHCH_3$, $N(CH_3)_2$ or $CH(OCH_3)_2$; and

Z is CH;

and their agriculturally suitable salts; provided that

(1) in Formulae II and II', when R_5 is NO_2, then R_6 is C_1–C_4 C_1–C_4 alkyl and R_6' is CH_3;

(2) when Q is SO, then W is O;

(3) when R_4 is other than H, then R_5 is H; and

(4) R_1 and R_2 taken together are not more than four carbon atoms.

17. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

4,695,311

HERBICIDAL SULFONAMIDES

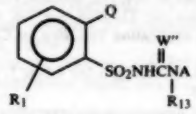
Morris P. Rorer, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 685,026, Dec. 21, 1984, Pat. No. 4,606,755, which is a division of Ser. No. 436,631, Oct. 29, 1982, Pat. No. 4,511,392, which is a continuation-in-part of Ser. No. 337,934, Jan. 7, 1982, abandoned. This application May 9, 1986, Ser. No. 861,260

Int. Cl.[4] A01N *43/54*; C07D *403/12, 413/12, 417/12*

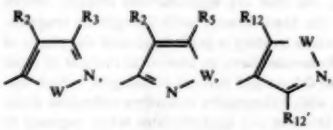
U.S. Cl. 71—92 37 Claims

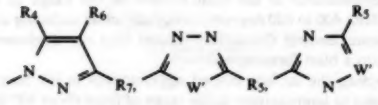
1. A compound of the formula:

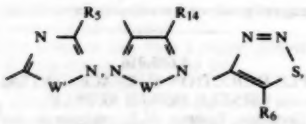


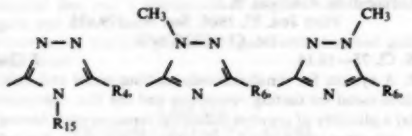
wherein

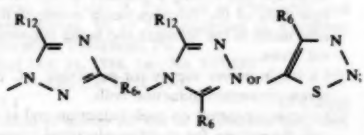
Q is











W" is O or S;

W is O, S or NR;

W' is O or S;

R is H or C_1–C_4 alkyl;

R_1 is H, F, Cl, Br, CH_3, CF_3 or OCH_3;

R_2 is H, CH_3, C_2H_5, Cl or Br;

R_3 is H, CH_3, C_2H_5, Cl, Br, OCH_3, OC_2H_5 or SCH_3;

R_4 is H or C_1–C_4 alkyl;

R_5 is H, CH_3, C_2H_5, Cl, Br, OCH_3, OC_2H_5 or SCH_3;

R_6 is H, CH_3 or C_2H_5;

R_7 is H or C_1–C_4 alkyl;

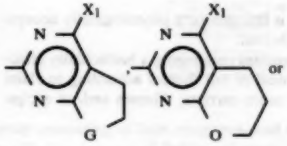
R_{12} is H or CH_3;

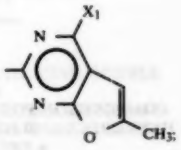
R_{12}' is H or CH_3;

R_{13} is H or CH_3;

R_{14} is H, CH_3, C_2H_5, Cl, OCH_3, OC_2H_5 or SCH_3;

R_{15} is C_1–C_3 alkyl; A is





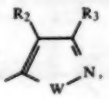
X_1 is CH_3, OCH_3 or Cl;

G is O or CH_2;

and their agriculturally suitable salts; provided that:

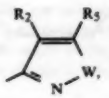
(a) when R_2 is Cl or Br, then W is O or S;

(b) when Q is



then one of R_2 or R_3 must be H, CH_3 or C_2H_5;

(c) when Q is



then one of R_2 or R_5 must be H, CH_3 or C_2H_5;

(d) the total number of carbon atoms of Q must be less than or equal to 8.

30. A composition suitable for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

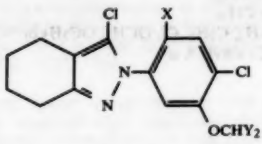
4,695,312

4,5,6,7-TETRAHYDRO-2H-INDAZOLE DERIVATIVES AND HERBICIDES CONTAINING THEM

Yoshio Hayase, Mie; Toshikazu Ohtsuka; Kinya Ide, both of Shiga, and Toshio Takahashi, Hyogo, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

Filed Mar. 31, 1986, Ser. No. 846,051
Claims priority, application Japan, Apr. 3, 1985, 60-71428
Int. Cl.[4] A01N *43/56*; C07D *231/56*
U.S. Cl. 71—92 4 Claims

1. A compound of the formula:



wherein X and Y each is halogen or a phytologically acceptable acid addition salt thereof.

4. A herbicidal composition comprising a herbicidally effective amount of a compound or salt thereof according to claim 1 together with one or more carriers, diluents and/or excipients.

4,695,313

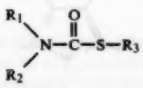
COMPOSITION FOR PROLONGING THE ACTION OF HERBICIDES AND HERBICIDE COMPOSITIONS WITH A PROLONGED ACTION

Barna Bordás; Antal Gimesi; Magda Kovács née Kálmán; Éva János; György Matolcsy, and Márton Tüske, all of Budapest, Hungary, assignors to Eszakmagyarorszagi Vegyimuvek, Sajobabony, Hungary

Filed Jun. 13, 1985, Ser. No. 744,513
Claims priority, application Hungary, Jun. 14, 1984, 2306/84
Int. Cl.[4] A01D *25/22*
U.S. Cl. 71—100 6 Claims

1. A composition with prolonged herbicidal activity which comprises:

(a) a thiolcarbamate compound of the Formula (I)

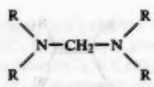


wherein

R_1, R_2 and R_3 are each independently C_1 to C_4 alkyl; or

R_1 and R_2 are each independently C_4 to C_6 cycloalkyl; and

(b) an extender compound of the Formula (III)



wherein the

R substituents are each independently C_1 to C_6 alkyl or C_2 to C_4 alkenyl, each unsubstituted or substituted by a C_1 to C_4 alkyl group; wherein at least two of the R substituents are each allyl and wherein the weight ratio between the herbicidal compound of the Formula (I) to the extender compound of the Formula (III) is 25:1 to 1:1.

4,695,314

S-BENZYL THIOLCARBAMATES AND THEIR USE IN CONTROLLING WEEDS IN RICE FIELDS

Lawrence L. Buren, Cupertino; Donald R. James, El Sobrante; Barney J. Randolph, San Jose; Eugene G. Teach; Harry Tilles, both of El Cerrito, and Francis H. Walker, Mill Valley, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 607,106, May 3, 1984. This application Apr. 28, 1986, Ser. No. 856,270
Int. Cl.[4] A01N *37/00*; C07C *155/02*
U.S. Cl. 71—100 4 Claims

1. S-benzyl-N-ethyl-N-1,2-dimethylpropyl thiocarbamate.

3. A method of controlling undesirable vegetation in rice crops comprising applying to the locus where control is desired an herbicidal composition comprising an herbicidally effective amount of S-benzyl-n-ethyl-n-1,2-dimethylpropyl thiocarbamate and an inert diluent carrier.

4,695,315

METHOD OF MINIMIZING REDUCTION DISINTEGRATION OF IRON ORES AND IRON ORE AGGLOMERATES TO BE USED AS BLAST FURNACE BURDEN

Heinrich Kortmann, Liebenburg, and Wolfgang Bock, Langelsheim, both of Fed. Rep. of Germany, assignors to Studiengesellschaft für Eisenerzaufbereitung, Liebenburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 000,209, Oct. 13, 1983. This application Jul. 13, 1984, Ser. No. 630,593
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1982, 3242086
Int. Cl.[4] C21B *5/00*; C22B *1/14*
U.S. Cl. 75—0.5 R 23 Claims

1. A method for minimizing disintegration of pieces of iron ore agglomerates during reduction of pieces of iron ore agglomerates in a blast furnace comprising

surface-treating the iron ore agglomerates directly before being fed to the blast furnace with halogenide reagents, where the surface treating is performed until the pieces of iron ore agglomerates have an analytical content of from about 0.001 to 0.1 weight percent in halogen, which surface treating with halogenides minimizes reduction disintegration of the iron ore agglomerates when exposed to temperatures in the blast furnace in the range of from about 400 to 600 degrees centigrade under reducing conditions; feeding the surface-treated iron ore agglomerates into a blast furnace; and

exposing the surface treated agglomerates in the blast furnace to temperatures in the range of from about 400 to 600 degrees centigrade under reducing conditions.

4,695,316

MULTIPLE INDUCTION FURNACE SYSTEM USING SINGLE POWER SUPPLY

Jesse M. Cartlidge, Trenton, N.J., assignor to Inductotherm Corporation, Rancocas, N.J.

Filed Jun. 27, 1986, Ser. No. 879,691
Int. Cl.[4] C22B *4/00*
U.S. Cl. 75—10.14 3 Claims

1. A system for simultaneously melting metal and holding molten metal for casting operations and the like, comprising:

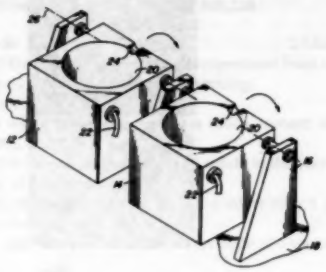
(a) a plurality of coreless induction furnaces each having an induction coil having a plurality of coil turns, the induction coils of the furnaces being arranged to inductively heat metal in the furnaces and being connected in electrical series,

(b) a single power supply for supplying AC power to the series-connected induction coils,

(c) connector means on each induction coil at spaced intervals therealong for enabling electrical connections to be

made to the induction coils at said intervals, each interval comprising a preselected number of coil turns, and

(d) switch means associated with each induction coil and connected to selected ones of the tap means for selectably



switching a preselected number of coil turns into and out of circuit with the power supply for selectively melting or holding molten metal in the induction furnace associated with a selected coil.

4,695,317

METHOD OF TREATING SILICATE ORE CONTAINING GOLD AND SILVER

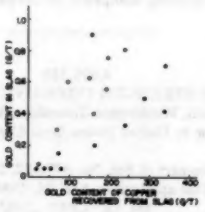
Takayoshi Kimura; Seiichi Tsuyuguchi, and Yoshiaki Mori, all of Niihama, Japan, assignors to Sumitomo Metal Mining Company Limited, Tokyo

Filed Jan. 29, 1986, Ser. No. 823,629

Claims priority, application Japan, Jan. 31, 1985, 60-17516; Jan. 31, 1985, 60-17517

Int. Cl.[4] C22B *11/00*

U.S. Cl. 75—24 **9 Claims**



1. A method of treating a silicate ore containing gold and silver which comprises the steps of

(1) providing a molten slag from a copper converter, said molten slag containing copper and iron,

(2) providing a reducing agent,

(3) adding said silicate ore containing gold and silver to said molten slag and said reducing agent so as to produce a treated slag and a precipitate of copper with absorbed gold and silver, and

(4) recovering the precipitate of copper with absorbed gold and silver.

4,695,318

METHOD OF MAKING STEEL

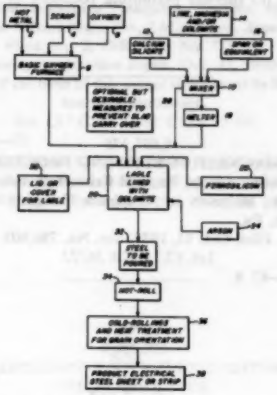
William F. Knauss, Jr.; Uday B. Pal, both of Pittsburgh, and Balaji V. Patil, Sarver, all of Pa., assignors to Allegheny Ludlum Corporation, Pittsburgh, Pa.

Filed Oct. 14, 1986, Ser. No. 917,864

Int. Cl.[4] C21C *7/02*

U.S. Cl. 75—51.1 **19 Claims**

1. A composition of matter for use as a synthetic slag, said composition of matter having been made by mixing a commercially pure calcium silicate material with an approximately equal quantity of alkaline-earth flux material selected from the



group consisting of lime, magnesia, and mixtures thereof, plus an effective amount of fluidity-promoting additive.

4,695,319

METAL DISTILLATION METHOD UTILIZING DOUBLE VAPORIZATION

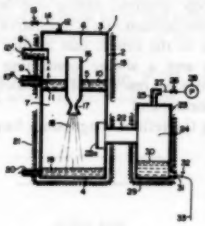
Hirohisa Miura; Hiroshi Satoh; Toshio Natsume, and Hidenori Katagiri, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Jul. 26, 1985, Ser. No. 759,309

Claims priority, application Japan, Nov. 30, 1984, 59-253417

Int. Cl.[4] C22B *26/22*

U.S. Cl. 75—63 **8 Claims**



1. A method for separating a certain metal from a mixture of said certain metal with other elements which have lower vapor pressure values than said certain metal, comprising the steps of:

(a) heating said mixture in order to partially vaporize said certain metal and said other elements with the result that the composition of the gas mixture generated by said heating is shifted to a mixture substantially enriched in said certain metal as a result of the differences in vapor pressure values of the elements which have been vaporized;

(b) adiabatically expanding said gas mixture resulting in said gas mixture being substantially liquified;

(c) allowing the liquified gas to vaporize principally by the heat of the liquified gas, the result of which is that the composition of the gas thus generated is further enriched in the amount of said certain metal because of the differences in vapor pressure value of the components of said liquified gas and also because the composition of the liqui-

fied gas is changed from that of the mixture which is originally heated; and

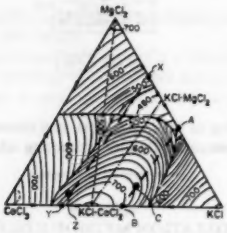
(d) collecting the gas generated by the vaporization process of step (c) thereby permitting recovery of said certain metal.

4,695,320

MAGNESIUM REFINING PROCESS

Roy A. Christini, Apollo, Pa., and Kenneth P. Frizzell, Chewelah, Wash., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 11, 1985, Ser. No. 786,903
Int. Cl.[4] C22B *26/22*
U.S. Cl. 75—67 A **9 Claims**



1. A process for refining magnesium crude provided by thermally reducing a magnesium source ore, the crude containing between about 0.7 and 1.5 wt. % calcium, said process comprising:

(a) providing a molten body of said magnesium crude;

(b) mixing a flux containing from 55 to 85 wt. % magnesium chloride and 45 to 15 wt. % of at least one alkali chloride into the body, wherein during said mixing a substantial portion of the calcium reacts to remove substantially all of the calcium in the crude, said mixing producing refined magnesium and a sludge containing calcium chloride resulting from the reaction of said calcium with said magnesium chloride; and

(c) separating the refined magnesium from the sludge.

4,695,321

DYNAMIC COMPACTION OF COMPOSITE MATERIALS CONTAINING DIAMOND

Tamotsu Akashi, Socorro, N. Mex., and Akira Sawaoka, Yokohama, Japan, assignors to New Mexico Tech Research Foundation, Socorro, N. Mex.

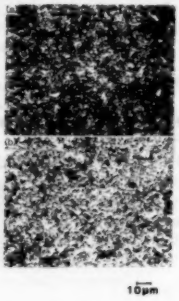
Continuation-in-part of Ser. No. 747,558, Jun. 21, 1965, Pat. No. 4,655,830. This application May 1, 1986, Ser. No. 858,449
Int. Cl.[4] C22C *29/00*
U.S. Cl. 75—243 **14 Claims**

1. A process for forming compacts of powders of ceramics, metals and cermets containing diamond powder and exothermically reactive additive powders comprising:

(a) mix high pressure phase diamond powder with non-stoichiometric exothermically reactive additive powders;

(b) compress the resulting mixture of powders into a compact; and

(c) apply a shock wave to said compact which is sufficient to compress the compact, to reduce at least a portion of the high pressure phase diamond powder into a low pressure phase at a residual temperature, and to cause exothermic



sintering of the powders, interparticle bonding, and a chemical reaction between the particles.

4,695,322

DUST-FREE ALGINATE IMPRESSION MATERIALS

Peter Schwabe, and Reiner Voigt, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 29, 1986, Ser. No. 913,824
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535132
Int. Cl.[4] A61K *6/10*; A61C *9/00*
U.S. Cl. 106—35 **8 Claims**

1. In an impression material comprising an alginate, a pulverulent material and a dust-reducing coating, the improvement wherein such coating comprises an iso-paraffin.

4,695,323

HIGH STRENGTH COKE-OVEN MORTAR

Roger L. Rueckl, Washington Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 677,422, Dec. 3, 1984, Pat. No. 4,596,601. This application Apr. 14, 1986, Ser. No. 851,189
Int. Cl.[4] C04B *12/02*
U.S. Cl. 106—85 **8 Claims**

1. A mortar which consists essentially of:

a solid particulate material constituent selected from the group consisting of crystobalite, tridymite, fused silica and mixtures thereof, said constituent providing 25 to 88 percent SiO_2 of the total solid particulate materials in said mortar on a dry basis, a solid particulate material constituent providing 6 to 65 percent Al_2O_3 in said mortar on a dry basis, a constituent providing 7 to 12 percent P_2O_5 of the solid particulate materials on a dry basis, at least seventy percent of said P_2O_5 being provided in colloidal form, said mortar including not more than 4 percent of other solid particulate material constituents, not more than 45 percent by weight of the solid particulate material constituents in said mortar having a size less than 74 microns, said liquid in the mortar being limited to an amount such that the weigth loss of the mortar on heating to a temperature of 104° C. 220° F. will not exceed 13.5 percent of the total weight of the mortar, the total weight loss of the mortar on heating to a temperature of 1100° C. (2012° F.) being not in excess of 15 percent, said mortar having at least 7 percent by weight P_2O_5 after heating at said temperature of 1100° C. (2012° F.).

4,695,324

METHOD FOR PROCESSING COAL PREPARATION PLANT WASHINGS FOR ELIMINATION OF SLUDGE PONDS

Benjamin Lieberman, 901 Valley Rd., Charleston, W. Va. 25302

Filed Jan. 9, 1984, Ser. No. 569,224
Int. Cl.[4] C04B *14/02*
U.S. Cl. 106—96 2 Claims

1. A method for solidifying coal waste suspensions from coal beneficiation processes, said method comprising:

(i) mixing, in a heated mixer,

(a) a coal waste suspension having a solids content of at least 50%, and

(b) 5 to 20%, based on the weight of solids in the suspension (a), of portland cement;

(ii) removing the heated mixture from the mixer after a 2 to 5 minute retention time; and

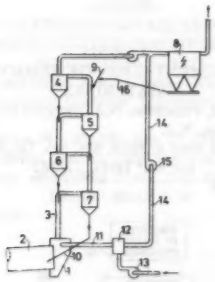
(iii) cooling the removed mixture to produce a disposable solid.

4,695,325

METHOD AND APPARATUS FOR PRODUCING CLINKER

Torben Enkegaard, Copenhagen, Denmark, assignor to F. L. Smidth & Co. A/S, Copenhagen, Denmark

Filed Apr. 9, 1986, Ser. No. 849,770
Claims priority, application United Kingdom, Jun. 3, 1985, 8513967
Int. Cl.[4] C04B *7/60*
U.S. Cl. 106—100 3 Claims



1. A method of producing clinker from raw material with an average chloride content of 0.015-0.1 weight percent of all raw material used in a kiln plant having at least one suspension preheater, comprising the steps of:

passing kiln exit gas with a chloride content through said preheater to a primary precipitator or filter, causing a portion of said exit gas to bypass said suspension preheater;

quenching said exit gas portion; and

passing said portion of exit gas after said quenching directly to said primary precipitator or filter without first encountering a separate precipitator or filter such that condensed chloride particles formed in said exit gas portion during the quenching step pass unimpeded through the primary precipitator or filter.

4,695,326

LOW-CARIOGENIC SWEETNERS

Ichiro Takazoe; Kosei Ohta, both of Tokyo; Junichi Shimizu, Yokohama; Kazumasa Suzuki, Ayase; Tatsuya Iwakura, Yokohama, and Yoshikazu Nakajima, Yamato, all of Japan, assignors to Mitsui Sugar Co., Ltd., Tokyo, Japan

Filed Sep. 3, 1985, Ser. No. 771,769
Claims priority, application Japan, Oct. 23, 1980, 55-147553
The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.
Int. Cl.[4] C13F *3/00*; C13K *13/00*
U.S. Cl. 127—30 3 Claims

1. A low-cariogenic sweetner which consists of a mixture of sucrose and palatinose wherein the proportion of palatinose is from 20 to 400 parts by weight per 100 parts by weight of sucrose.

4,695,327

SURFACE TREATMENT TO REMOVE IMPURITIES IN MICRORECESSES

Thomas J. Grebinski, Sunnyvale, Calif., assignor to Purusar Corporation, Sunnyvale, Calif.

Filed Jun. 13, 1985, Ser. No. 745,241
Int. Cl.[4] B08B *5/00, 30/00*
U.S. Cl. 134—11 10 Claims

1. A method of treating a surface of an object to remove impurities in microrecesses having minimum dimensions of 10 microns or less with a condensible solvent which has a vapor pressure, P^*, at a treating temperature, T, comprising:

(1) positioning the object, with the surface exposed, within a sealed treating chamber having therein a limited number of potential spaceborne nucleation centers at said temperature, T;

(2) introducing said solvent into said chamber until the pressure, P, of the solvent in the chamber is sufficient so that a plurality of molecular layers of the solvent is adsorbed in the microrecesses while maintaining a ratio of P/P^* in the chamber below unity and below that at which substantial spaceborne nucleation of the solvent occurs; and

(3) thereafter increasing the ratio, P/P^*, until the solvent condenses and wets the microrecesses.

4,695,328

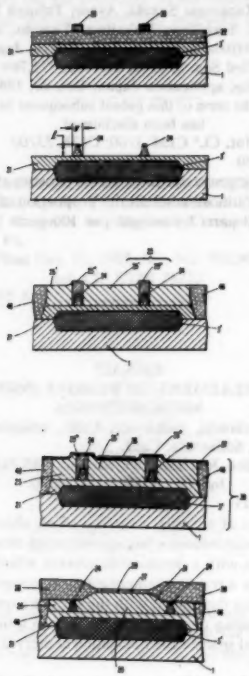
METHOD OF MAKING A BIPOLAR TRANSISTOR

Masatoshi Moriyama, and Masaki Ohira, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Aug. 6, 1985, Ser. No. 762,867
Claims priority, application Japan, Aug. 7, 1984, 59-165268
Int. Cl.[4] H01L *21/04*
U.S. Cl. 437—31 3 Claims

1. A method of manufacturing a semiconductor device comprising the steps of forming an insulating film on an upper surface of a semiconductor body, forming selectively a mask pattern on said insulating film, etching selectively said insulating film by using said mask pattern to form a protruded insulating wall on said semiconductor body, depositing a semiconductor layer on said semiconductor body and on said protruded insulating wall, forming selectively an anti-oxidized film on said semiconductor layer within said protruded insulating wall, using said anti-oxidized film as a mask during thermal oxidation to form an insulating layer, the lower surface of said insulating layer contiguous with the upper surface of said

protruded insulating wall, removing said anti-oxidized film, and introducing an impurity into said semiconductor layer



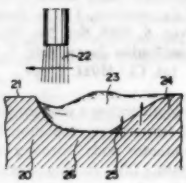
within said protruded insulating wall to form an impurity region therein.

4,695,329

METHOD FOR MANUFACTURING A CYLINDER HEAD OF CAST ALUMINUM ALLOY FOR INTERNAL COMBUSTION ENGINES BY EMPLOYING LOCAL HEAT TREATMENT

Souichi Hayashi, Nagoya; Johji Miyake, Okazaki; Mototsugu Koyama, and Kanji Sakaguchi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 20, 1986, Ser. No. 831,708
Claims priority, application Japan, Feb. 21, 1985, 60-31627
Int. Cl.[4] C21D *1/09*; B22D *25/00*; C22F *1/00*
U.S. Cl. 148—3 **7 Claims**



1. A method for manufacturing a cylinder head of cast aluminum alloy for internal combustion engines, comprising the steps of

casting a cylinder head body from an aluminum alloy,

directing a high density irradiating of at least one region of said cylinder head body where a high strength is required, thereby rapidly remelting a surface layer in said region, and

subsequently removing the irradiating energy and allowing the molten aluminum alloy of the surface layer to be rapidly cooled and solidified through heat transfer therefrom to the underlying matrix, thereby forming a remelted, solidified layer.

4,695,330

METHOD OF MANUFACTURING INTERNAL OXIDIZED AG-SNO SYSTEM ALLOY CONTACT MATERIALS

Akira Shibata, Yokohama, Japan, assignor to Chugai Denki Kogyo K.K., Japan

Division of Ser. No. 771,341, Aug. 30, 1985, Pat. No. 4,647,322. This application Sep. 30, 1986, Ser. No. 913,196
Int. Cl.[4] C23C *8/10*
U.S. Cl. 148—6.3 **5 Claims**

1. A method of making internal oxidized Ag-SnO system alloy electrical contact materials which comprises preparing an Ag alloy layer having a thickness at least twice as thick as a desired thickness, wherein said alloy comprises 0.5–12 weight % of Sn, and a metal selected from the group consisting of In in a 0.5–15 weight percent and Bi in a 0.01 to less than 1.5 weight percent,

sandwiching said alloy layer between pure thin silver layers,

completely internally oxidizing said alloy layer to form a depleted layer which lies centrally and transversely to the axis or to the height of said alloy layer, and

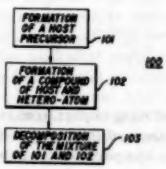
cutting said alloy layer along said depleted layer thereby removing said depleted layer.

4,695,331

HETERO-AUGMENTATION OF SEMICONDUCTOR MATERIALS

K. R. Ramaprasad, Princeton, N.J., assignor to Chronar Corporation, Princeton, N.J.

Filed May 6, 1985, Ser. No. 731,072
Int. Cl.[4] H01L *21/365*
U.S. Cl. 437—126 **14 Claims**



1. The method of forming a doped semiconductor which comprises the steps of:

(a) feeding a gaseous host semiconductor precursor to a reaction chamber;

(b) introducing a gaseous compound of the host and a hetero-atom into the reaction chamber, said hetero-atom being a dopant for said semiconductor; and

(c) reacting the mixture of the precursor and the compound in said chamber.

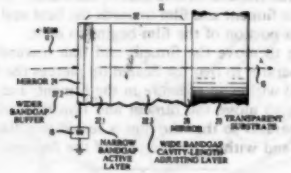
4,695,332
METHOD OF MAKING A SEMICONDUCTOR LASER CRT

Eugene I. Gordon, Convent Station, and Uri Levy, Berkeley Heights, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 453,577, Dec. 27, 1982, Pat. No. 4,539,687. This application May 28, 1985, Ser. No. 737,787

Int. Cl.[4] H01L *21/20, 21/36*

U.S. Cl. 437—126 **3 Claims**



1. A method of fabricating a target for an electron-beam-pumped semiconductor laser, comprising the steps of:

providing a single crystal semiconductor body,

epitaxially growing on the body a plurality of layers including: a thin, buffer layer of a relatively wide bandgap semiconductor on the body; a thicker, narrower bandgap active layer on the buffer layer; and a much thicker, wider bandgap cavity-length-adjusting layer on the active layer,

forming on the cavity-length-adjusting layer a first mirror which is partially transmissive at the optical wavelength of the laser,

affixing a transparent substrate to the first mirror,

removing the single crystal substrate to expose the buffer layer, and

forming on the buffer layer a second mirror, including a metal layer, which is highly reflecting at the optical wavelength.

4,695,333
IRON-CHROMIUM-BASE SPINODAL DECOMPOSITION-TYPE MAGNETIC (HARD OR SEMI-HARD) ALLOY

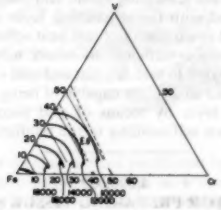
Kiyoshi Inoue, and Hideo Kaneko, both of Tokyo, Japan, assignors to Inoue-Japax Research Incorporated, Kanagawaken, Japan

Continuation of Ser. No. 304,931, Sep. 23, 1981, abandoned. This application Dec. 22, 1986, Ser. No. 946,106

Claims priority, application Japan, Sep. 29, 1980, 55-136009

Int. Cl.[4] H01F *1/04*

U.S. Cl. 148—306 **9 Claims**



1. A hard or semihard magnet consisting of a spinodally decomposed iron-chromium base ternary alloy composition consisting of 3 to 40% by weight vanadium, 5 to 45% by weight chromium and the balance iron wherein said alloy composition contains iron in an amount of not less than 40% by weight.

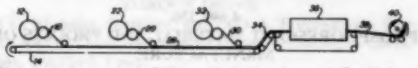
4,695,334
METHOD OF MAKING WATER IMPERVIOUS MATERIALS

Alfred T. Mays, East Windsor, N.J., assignor to Chicopee, New Brunswick, N.J.

Division of Ser. No. 689,123, Jan. 7, 1985, Pat. No. 4,595,629, which is a division of Ser. No. 588,037, Mar. 9, 1984, Pat. No. 4,522,203. This application Mar. 3, 1986, Ser. No. 835,132

Int. Cl.[4] B32B *27/00*; D04H *1/04*

U.S. Cl. 156—62.2 **4 Claims**



1. A process for preparing a water impervious laminated material comprising at least one layer of conjugate fibers, said layer of conjugate fibers having a first face and an opposite face, said conjugate fibers being composed of a lower melting component and a higher melting component, wherein a substantial proportion of the surfaces of said conjugate fibers comprises said lower melting component, said lower melting component of said conjugate fibers which lie on said first face being fuse bonded to a first layer of plastic laminated film which comprises said first layer and an additional layer, said first layer of said film being thermoplastic and possessing a lower melt temperature than said additional layer of said film, said lower melting component of said fibers having been fuse bonded at a temperature below the melt temperature of said higher melting component of said fibers so that the latter component retains its initial fiber-like integrity;

said process comprising forming an assembly of said laminated film and at least one layer of said conjugate fibers placed adjacent to said first layer of said plastic film;

subjecting said assembly to a temperature sufficient to fuse said lower melting component of said conjugate fibers which lie on said first face as well as the first layer of the film in contact with said fibers without fusing the higher melting component of said conjugate fibers nor the additional layer of film, while maintaining said assembly under minimal pressure;

and cooling said assembly to resolidify said lower melting component of the fibers as well as said first layer of said film, whereby said fibers are firmly bonded to said film without impairing the integrity of said higher melting component of said fibers.

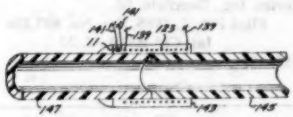
4,695,335
METHOD FOR DEVELOPING A PREDETERMINED FUSING TEMPERATURE IN THERMOPLASTIC ITEMS

Lucian H. Lyall, Woodland Hills, Calif., assignor to R. W. Lyall & Company, Inc., Santa Fe Springs, Calif.

Filed Nov. 8, 1985, Ser. No. 796,565

Int. Cl.[4] B32B *31/26*

U.S. Cl. 156—64 **9 Claims**



1. A method of developing a predetermined fusion welding temperature at an interface between a thermoplastic collar and abutting thermoplastic pipe sections over which such collar is telescoped, comprising:

increasing the temperature of the interface at a relatively slow preheating rate;

sensing the attainment of a predetermined preheat temperature at the interface;
increasing the temperature of the interface at a relatively fast fusion rate only upon attainment of said predetermined preheat temperature;
sensing the attainment of said predetermned fusion welding temperature at the interface; and
allowing the interface to cool when said predetermined fusion welding temperature has been attained.

4,695,336

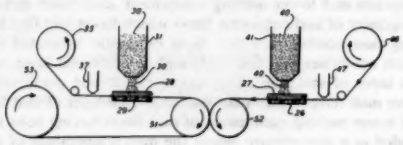
PHOSPHORESCENT MATERIAL AND PROCESS OF MANUFACTURE

Joseph W. Coburn, Jr., P.O. Box 1585, Lakewood, N.J. 08701

Division of Ser. No. 786,759, Oct. 11, 1985, Pat. No. 4,663,214, and a continuation-in-part of Ser. No. 687,502, Jan. 4, 1985, abandoned, which is a continuation of Ser. No. 581,340, Feb. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 512,034, Jul. 8, 1983, abandoned. This application Sep. 18, 1986, Ser. No. 909,035

Int. Cl.[4] B32B *31/12*; B44F *1/14*

U.S. Cl. 156—67 **4 Claims**



1. Process of making phosphorescent material decorative in visible light, comprising the steps of:
providing a first layer of substantially clear dry adhesive to a support layer of substantially opaque material;
providing a second layer of substantially clear dry adhesive to a layer of substantially clear plastic film;
applying a layer of dry phosphorescent particles to said first layer of substantially clear dry adhesive;
providing a layer of dry substantially transparent iridescent particles to said second layer of substantially clear dry adhesive; and
assembling said layers wherein said support layer of substantially opaque material and said layer of substantially clear plastic film each face outward and applying predetermined heat and pressure to said layers to bond said layers together wherein the combination of the iridescent particle layer and the phosphorescent particle layer provides an iridescent decorative effect in visible light and a substantial after-glow effect in darkness.

4,695,337

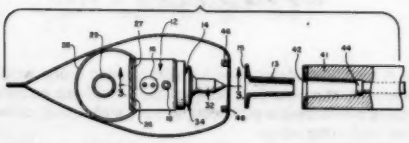
APPARATUS AND METHOD FOR ATTACHING A FITMENT TO A WEB OF FILM

William Christine, Catasauqua, Pa., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Feb. 1, 1985, Ser. No. 697,534

Int. Cl.[4] B32B *31/20*

U.S. Cl. 156—69 **32 Claims**



1. An apparatus for attaching a fitment having a flange and an aperture to a web of film in a form, fill, and seal flexible bag making machine comprising:
means for orienting the fitment on one side of the film including a movable press and ejector pin; and
means for contemporaneously piercing and sealing the film to the flange of the fitment and within the aperture of the fitment.

25. A method for attaching a fitment to a web of film utilizing a heat seal apparatus including a heated face and heated tip comprising the steps of:
heating the heat seal apparatus;
orienting the fitment on one side of the film;
moving the fitment and film towards the heat seal apparatus so that a portion of the film begins to melt;
continuing to move the fitment and film towards the heat seal apparatus so that the heated tip pierces the film and is received within an aperture in the fitment; and
continuing to move the fitment and film towards the heat seal apparatus so that the film is sealed to a flange of the fitment and within the aperture of the fitment.

4,695,338

INSULATING AND IMPERVIOUS ROOFING PANELS AND A PROCESS AND APPARATUS FOR THEIR MANUFACTURE

Stephane Cousin, Lamorlaye, and Jean-Paul Boumendil, Paris, both of France, assignors to Isover Saint-Gobain, Courbevoie, France

Filed Oct. 31, 1983, Ser. No. 547,219

Claims priority, application France, Oct. 29, 1982, 82 18166

Int. Cl.[4] E04B *2/00*

U.S. Cl. 156—71 **9 Claims**

1. A process for the manufacture of a heat insulating and liquid impervious fibrous panel which may be covered with at least one hot applied bituminous coating, said process comprising the steps of:
forming a dense mat of felt consisting of mineral fibres bonded together by a first thermosetting binder finely dispersed therein,
stabilizing the mass per unit volume of said mat by a heat treatment to set said binder, and
applying to at least one main surface of said mat a pliant composite covering comprising together a fiberous reinforcing layer impregnated with a heat softened binder and a sheet of pliant separating agent, said composite covering being applied with the reinforcing layer in contact with said mat and in a quantity of said heat softened binder and at a temperature sufficient to ensure adherence of said reinforcing layer to said felt mat and said separating agent being selected so as to be capable of being bonded to said reinforcing layer by means of said second binder and capable of hot self-welding to the reinforcing layer.

4,695,339

METHOD FOR PREPARING TISSUE SECTIONS

David C. Rada, 6347 Outlook, Mission, Kans. 66202

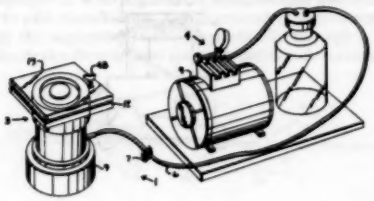
Filed Oct. 3, 1986, Ser. No. 914,814

Int. Cl.[4] B32B *35/00*

U.S. Cl. 156—80 **3 Claims**

1. A method for preparing a tissue specimen for sectioning in a microtome or the like; said method comprising:
(a) positioning said tissue specimen on a polished disc with an undersurface of said tissue specimen to be examined contacting a surface of said disc;

(b) placing said polished disc in a receptacle structure;
(c) covering said polished disc and said tissue specimen with a membrane;
(d) sealing said membrane relative to said receptacle structure and over said polished disc and said tissue specimen;
(e) drawing air from said receptacle structure in such a manner as to retract said membrane toward said receptacle structure, thereby tending to flatten an undersurface of said tissue specimen;
(f) manipulating said tissue specimen to a desired orientation on said polished disc;
(g) freezing said tissue specimen onto said polished disc;



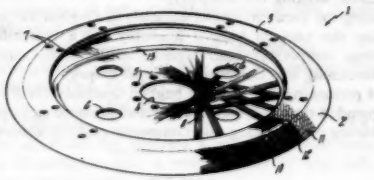
(h) removing said membrane from a polished disc/tissue specimen complex formed by the freezing of said tissue specimen to said polished disc;
(i) applying an embedding medium to said polished disc/tissue specimen complex;
(j) mating said polished disc/tissue specimen complex with a corrugated disc having an embedding medium thereon; and
(k) disengaging said polished disc from said tissue specimen, which is retained by said embedding medium and said corrugated disc, whereby said tissue specimen undersurface presents a generally planar surface for sectioning.

4,695,340

FILAMENT WOUND STRUCTURE HAVING FILAMENT WOUND REINFORCING RINGS FOR USE AS A TORQUE DRIVE

David G. Matuska, Stratford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 781,605, Sep. 30, 1985, Pat. No. 4,629,644. This application Jun. 2, 1986, Ser. No. 869,550
Int. Cl.[4] B65H *21/00*
U.S. Cl. 156—161 **17 Claims**



1. A method of forming a fiber reinforced resin composite structure, particularly adapted for use as a torque drive diaphragm in a rotary wing aircraft hub, comprising winding fiber impregnated with resin on a mandrel with sufficient tension substantially tangentially to a central attachment-means in a multiple circuit pattern to form a diaphragm having a rim and a rim attachment means, winding reinforcing fiber impregnated with resin in an essentially circumferential manner with about 1000 to about 10,000 pounds per square inch tension to reinforce the rim of the structure, wherein the reinforcing fibers are interleaved with the tangential fibers, and winding reinforcing fibers impregnated with resin in a substantially circular manner to form at least one reinforcing ring, the ring located concentrically on the diaphragm or within the diaphragm, the structure is then cured by molding at sufficient heat and pressure thereby producing a structure such that the diaphragm remains essentially uniplanar when subjected to stresses induced by temperature changes, and the structure is resistant to buckling under torque loads.

4,695,341

FILAMENT WOUND STRUCTURE FOR USE AS A TORQUE DRIVE

David G. Matuska, Stratford, and Evan A. Fredenburgh, Fairfield, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 734,982, May 16, 1985, Pat. No. 4,666,753. This application Jun. 2, 1986, Ser. No. 869,551
Int. Cl.[4] B65H *81/00*
U.S. Cl. 156—161 **16 Claims**

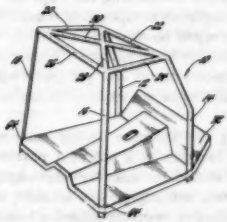
1. A method of forming a fiber reinforced resin composite structure, particularly adapted for use as a torque drive diaphragm in a rotary wing aircraft hub, comprising winding fiber impregnated with resin on a mandrel with sufficient tension substantially tangentially to a central hole in a multiple circuit pattern to form a diaphragm having a rim and an inward turning flange, and winding reinforcing fiber impregnated with resin in an essentially circumferential manner with about 1000 to about 10,000 pounds per square inch tension to reinforce the rim of the structure, wherein the reinforcing fibers are interleaved with the tangential fibers, the structure is then cured by molding at sufficient heat and pressure thereby producing a structure such that the diaphragm remains essentially uniplanar when subjected to stresses induced by temperature changes.

4,695,342

METHOD OF FORMING TRUCK CAB FRAMES

Gordon F. Belleau, Algonac; Michael J. Jelcin, Rochester, and Charles F. Verga, Holly, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 28, 1985, Ser. No. 717,313
Int. Cl.[4] B65H *81/00*
U.S. Cl. 156—173 **1 Claim**



1. The method of forming a pair of truck cab frames comprising the steps of:
providing a pair of mandrels in base-to-base relationship, each mandrel having four corner pillar channels for form-

ing four corner pillars, the corner pillar channels of one mandrel being aligned with the corner pillar channels of the other mandrel, each mandrel further having four roof rail channels for forming four roof rails, each mandrel also having two cross channels for forming two roof cross-members, the cross channels overlapping and having a flat surface in the overlapping region, the cross channels having a curvilinear surface in the remaining regions, the corner pillar channels and the roof rail channels also having a curvilinear surface, each corner pillar channel of each mandrel intersecting a cross channel and two roof rail channels of that mandrel, the intersections on one mandrel being designated LRA, RRA, RFA and LFA in a counterclockwise direction, the intersections on the other mandrel being designated RRB, LRB, LFB and RFB, RRB being aligned with LRA, LRB being aligned with RRA, LFB being aligned with RFA, and RFB being aligned with LFA,

winding filamentary material about said mandrels in the pattern RRB, LFB, RFB, LRB, LFB, RFA, LFA, RRA, LRA, RRB, RFB, LFA, LRA, RFA, RRA, LRB, RRB to form four corner pillars, four roof rails, and two roof cross-members of each frame,

and separating the corner pillars of one frame from the corner pillars of the other frame adjacent the bases of said mandrels.

4,695,343

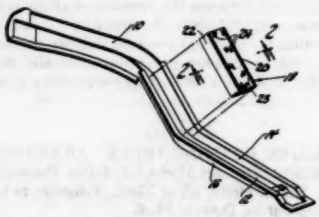
METHOD OF REINFORCING A STRUCTURAL MEMBER

Joseph S. Wycech, Grosse Pointe Farms, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 674,226, Nov. 23, 1984, Pat. No. 4,610,836, which is a continuation-in-part of Ser. No. 531,058, Sep. 12, 1983, abandoned. This application May 19, 1986, Ser. No. 864,311

Int. Cl.[4] B28B *7/30*; B29C *33/78*

U.S. Cl. 156—196 **7 Claims**



1. A method of reinforcing a selected portion of the walls of a structural member comprising the steps of:

coating macrospheres composed of bonded together hollow microspheres and having a diameter of 3 to 9 mm. with a curable adhesive in an amount effective to bond together adjacent macrospheres and yet leave voids between the macrospheres upon subsequent curing of the curable adhesive;

close-packing the adhesive coated macrospheres into the structural member at a selected portion thereof to be reinforced so that the macrospheres engage the structural member walls and engage one another; and

curing the adhesive to create adhesive bonding between the macrospheres and the structural member whereby the structural member is reinforced by the bonded together mass of macrospheres and airflow is permitted through the structural member via the voids between the closely packed adhesively bonded macrospheres.

4,695,344

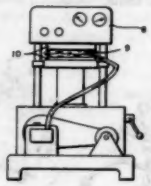
RESIN IMPREGNATION AND PROCESSING TECHNIQUE FOR RIGIDIZING NET-SHAPED FIBROUS SKELETAL COMPOSITE PREFORMS

Roger M. Crane, Baltimore, and Aleksander B. Macander, Rockville, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 29, 1985, Ser. No. 717,767

Int. Cl.[4] B32B *31/20*

U.S. Cl. 156—242 **13 Claims**



1. A method for fabricating a composite material into shapes comprising:

supplying at least one impregnating resin sheet;

providing a layered apparatus by preparing a closed type mold having a depth in excess of a finished thickness of said composite material;

placing a sheet of peel ply on said closed type mold to aid in disassembly;

placing at least one of said impregnating resin sheets on said peel ply;

placing a fiber preform to be impregnated with said impregnating resin on said at least one of said impregnating resin sheets;

placing at least another impregnating resin sheet on said fiber preform;

placing the layered apparatus in a vacuum oven;

heating the layered apparatus and removing air from the layered apparatus wherein wicking action and gravitational flow result in said impregnating resin material saturating said fiber preform;

removing the layered apparatus from said vacuum oven;

placing another sheet of peel ply on the layered apparatus to aid in disassembly;

placing a spacer in said closed mold for controlling said finished thickness of said saturated fiber preform;

placing a pressure plate over said closed type mold;

vacuum bagging the assembly;

placing the vacuum bagged assembly in a means for processing the vacuum bagged assembly for a recommended time, temperature and pressure sufficient for curing or hardening said composite material shapes;

and processing the vacuum bagged assembly for a recommended time and temperature and pressure sufficient for curing or hardening said composite material shapes.

4,695,345

CONTINUOUS OR SEMI-CONTINUOUS PROCESS FOR FORMING RECONSOLIDATED WOOD PRODUCT

William G. Grace, Warragul, Australia, assignor to Repco Limited, Melbourne, Australia

PCT No. PCT/AU84/00242, § 371 Date Jul. 23, 1985, § 102(e) Date Jul. 23, 1985, PCT Pub. No. WO85/02368, PCT Pub. Date Jun. 6, 1985

PCT Filed Nov. 23, 1984, Ser. No. 765,308

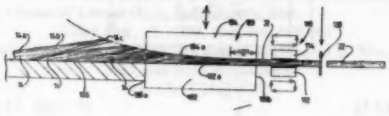
Claims priority, application Australia, Nov. 23, 1983, PG2517

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—264 **7 Claims**

1. A process for forming an extended elongate reconsolidated wood product from a plurality of flexible open lattice

work webs each of naturally interconnected wood strands, each said web being formed by partially rending natural wood so that said strands thereof are generally aligned along a common grain direction, a substantial proportion of said strands of each web being substantially discrete but incompletely separated from each other, said process comprising superposing said webs in such a fashion that the webs make an acute angle to the longitudinal direction of extent of the product and so that adjacent webs partly overlap each other in said direction and applying a bonding agent to the webs, compressing the superposed webs to consolidate the strands while maintaining them such as to substantially extend in said original grain direction and curing the bonding agent to hold the strands of said superposed webs together in juxtapositions assumed pursuant to said consolidation, said compressing step comprising passing the superposed webs longitudinally through a compression device from an inlet end to an outlet end, the compression device comprising two compression elements relatively movable towards each other from an open condition to effect said compression and consolidation, said passing step comprising relatively displacing the superposed webs through the compression device from the inlet end a distance less than one half the length of the compression device between the inlet and outlet ends when the compression elements are in their open condition and wherein the compression elements are moved towards each other to effect said compression and consolidation when the superposed webs are stationary in the longitudinal direction and said curing is effected when the superposed webs are compressed by the compression elements in portions of the superposed webs in the compression device adjacent the outlet end thereof, and said passing step, said compression and consolidation and said curing are repeated along the entire length of the superposed webs to produce said extended product.



4,695,346

APPARATUS FOR APPLYING TRANSVERSE WELD SEAMS TO AN INTERMITTENTLY MOVED PLASTIC FOIL WEB

Karl Dreckmann, Hennef-Altenbödingen; Jakob Schneider, Niederkassel-Mondorf, and Hans-Werner Theuner, Troisdorf-Müllekoven, all of Fed. Rep. of Germany, assignors to Lemo M. Lehmacher & Sohn GmbH Maschinenfabrik, Niederkassel-Mondorf, Fed. Rep. of Germany

Filed Nov. 8, 1985, Ser. No. 796,644

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1984, 3441173; Jun. 14, 1985, 3521351

Int. Cl.[4] B32B *31/20*

U.S. Cl. 156—361 **2 Claims**

1. An apparatus for applying a transverse weld seam to a web in dependence upon a print register on said web, said apparatus comprising:

means defining a transport path for said web extending in a longitudinal direction thereof;

a welding unit extending across said path and actuatable to apply a transverse weld thereto;

conveying means engageable with said web for advancing said web along said path and including a pinion gear;

means operatively coupling said conveying means and said welding unit for synchronous operation thereof;

a drive disk rotatable about a first axis;

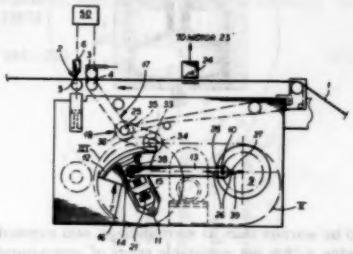
a coupling rod pivotally connected as a first pivot at one end with said drive disk eccentrically of said axis;

means for selectively positioning said first pivot on said disk at a selected distance from said first axis for coarse setting of the advance of said web in accordance with the print register thereon;

a rocker pivotally connected at a second pivot to an opposite end of said coupling rod;

a gear segment swingable about a second axis parallel to said first axis and spaced therefrom and meshing with said pinion gear, said rocker being shiftable along said gear segment generally radially of said second axis.

a threaded spindle coupled with said rocker for shifting same generally radially of said second axis upon rotation of said threaded spindle;



a toothed wheel on said threaded spindle;

a toothed belt engaging said toothed wheel;

a setting motor having another toothed wheel engaging said belt for displacing said spindle for fine adjustment of the advance of said web in accordance with said print register thereon; and

photocell upstream of said welding unit along said path for detecting the print register on said web and controlling said setting motor for fine adjustment of a location of a weld seam for each print register successively passing said photocell and said welding unit.

4,695,347

PROCESS FOR THE FORMATION OF SINGLE CRYSTALS FROM THE GAS PHASE

Klaus Fischer, Herzogstrasse, Fed. Rep. of Germany, assignor to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Fed. Rep. of Germany

Continuation of Ser. No. 576,026, Feb. 1, 1984, abandoned. This application Nov. 22, 1985, Ser. No. 800,897

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1983, 3304060

Int. Cl.[4] C30B *23/06*

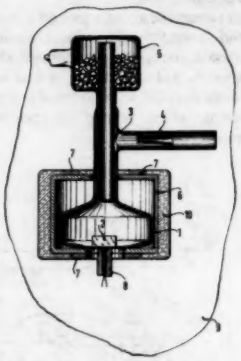
U.S. Cl. 156—610 **2 Claims**

1. In a process for the formation of single crystals from the gas phase wherein source gases are formed in a vessel from solid starting materials and the source gases are conducted to a walled growth chamber provided for the formation of a single crystal, said chamber being heated to a temperature to maintain said source gases in the gaseous phase and wherein the single crystal which is growing on a surface within said growth chamber is exposed to a static temperature gradient between the exposed crystal surface and the surroundings within the growth chamber, wherein the improvement comprises:

heating the walls of the growth chamber to a temperature required to maintain said source gases in a gaseous phase until the formation of nuclei of the single crystal is accomplished on a cooled growth surface in the growth chamber, and

subsequent to the formation of the nuclei, cooling the walls

of the growth chamber to provide a temperature gradient effective to cause the entire exposed surface of the crystal



to be warmer than its surroundings, said exposed surface being within the metastable range of supersaturation.

4,695,348

COPPER ETCHING PROCESS AND PRODUCT

James F. Battey, Los Altos; Norvell J. Nelson, Palo Alto, and Daniel J. Barnett, San Jose, all of Calif., assignors to PSI Star, Fremont, Calif.

Filed Sep. 15, 1986, Ser. No. 907,078

Int. Cl.[4] C23F *1/02*; B44C *1/22*

U.S. Cl. 156—647 **33 Claims**

1. In a process utilizing a liquid etchant for manufacturing a circuit board, the steps of: selecting a copper foil having a top surface crystal structure which is etched anisotropically and with a vertical-to-lateral etching ratio of at least 10:1 by the liquid etchant, bonding the copper foil to a substrate, and exposing a portion of the copper foil to the liquid etchant to remove that portion of the foil from the substrate.

4,695,349

PROCESS AND APPARATUS FOR DISTILLATION AND/OR STRIPPING

Hans Becker, Munich, and Gerhard Linde, Grünwald, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

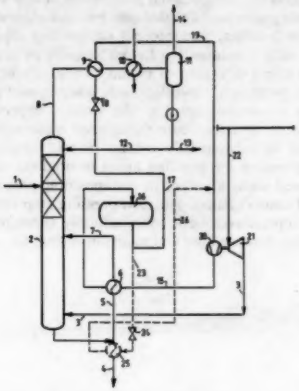
Filed Mar. 7, 1985, Ser. No. 709,247

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1984, 3436021

Int. Cl.[4] B01D *3/14*

U.S. Cl. 203—26 **11 Claims**

1. In a process for the fractionation of liquid involving introducing a gas or vapor as stripping medium to the lower portion of a column and heating the sump of the column and cooling the head of the column, with heating and cooling being effected with a heat pump system coupling the heating and cooling operations to each other, the improvement comprising driving the heat pump system by expansion of a gas or vapor,



and after expansion of said gas or vapor, passing the expanded gas or vapor for use as said stripping medium in the column.

4,695,350

SEPARATION OF N-HEXYL ACETATE FROM N-HEXYL ALCOHOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715

Filed Jan. 27, 1986, Ser. No. 822,604

The portion of the term of this patent subsequent to Jun. 25, 2002, has been disclaimed.

Int. Cl.[4] B01D *3/40*; C07C *67/48*

U.S. Cl. 203—51 **2 Claims**

1. A method for recovering n-hexyl acetate from a mixture of n-hexyl acetate, n-hexyl alcohol and water which comprises distilling a mixture of n-hexyl acetate, n-hexyl alcohol and water in a rectification column in the presence of about one part of extractive agent per part of n-hexyl acetate-n-hexyl alcohol-water mixture, recovering n-hexyl acetate and water as overhead product and obtaining the n-hexyl alcohol and the extractive agent from the stillpot, the extractive agent comprises dimethylsulfoxide.

4,695,351

METHOD FOR PRODUCING MAGNETIC HEADS

Michael L. Mallary, Berlin, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 10, 1986, Ser. No. 884,013

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 **6 Claims**

1. A process for fabricating a yoke member with a magnetic flux conducting path for a high frequency switching magnetic read head comprising the steps of:

(a) forming a mask means on a suitable electricity conducting base;

(b) electroplating a layer of magnetic flux permeable material through said mask means onto said electricity conducting base; and

(c) subjecting said layer of magnetic flux permeable material, during said electroplating step, to a biasing magnetic flux field having a value which is not less than $H_{demag}/4$ where H_{demag} is determined by the following equation:

$$H_{demag} = Ms(90° + \text{TAN}^{-1}(T/W))/360°$$

where:

H_{demag} = The demagnetizing field at the corner in Oer-

steds when the structure is completely saturated in the width direction,

Ms=Average saturation flux density in gauss (10,000 gauss for permalloy with no gaps),

T=Maximun structure thickness obtained during plating (in microns),

W=The pole structure width (in microns),

TAN^{-1}=Inverse tangent function in degrees,

(d) forming said electricity conducting base with said electroplated layer of magnetic flux permeable material thereon into a yoke member to be used as part of said high frequency switching magnetic read head.

4,695,352

ELECTROCHEMICAL REDUCTION OF PYRIDINE CARBOXAMIDE BASES

Joseph E. Toomey, Jr., Indianapolis, Ind., assignor to Reilly Tar & Chemical Corporation, Indianapolis, Ind.

Filed Dec. 31, 1984, Ser. No. 688,061

The portion of the term of this patent subsequent to Nov. 13, 2001, has been disclaimed.

Int. Cl.[4] C25B *3/00*

U.S. Cl. 204—74 **15 Claims**

1. In an electrochemical reduction of a pyridine carboxamide base, the improvement comprising the step of conducting the electro-reduction reaction at a high hydrogen-overvoltage cathode in a flow cell having an ion-exchange membrane divider, said conducting further being in an aqueous or partly aqueous medium comprising a Lowry-Bronsted acid in at least a 1:1 equivalent ratio with the base.

4,695,353

PROCESS FOR THE PRODUCTION OF SILVER (III) OXIDE

Martin Jansen, Hanover, and Burkhard Standke, Adenstedt, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 13, 1985, Ser. No. 797,527

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1984, 3442719

Int. Cl.[4] C25B *1/00*; C01G *5/00*

U.S. Cl. 204—96 **21 Claims**

1. A process for the production of silver (III) oxide which is free from Ag_2O comprising anodically oxidizing an aqueous solution of a silver (III) salt with a complex ion other than the nitrate or sulfate at a current density of 40 to 2000 A/m at a temperature of −15° to +10° C., and recovering the silver (III) oxide free from Ag_2O.

4,695,354

MEDIUM FOR ELECTROPHORESIS

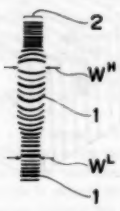
Mitsuru Sugihara, and Naohiko Sugimoto, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 17, 1986, Ser. No. 908,376

Claims priority, application Japan, Sep. 18, 1985, 60-206090

Int. Cl.[4] G01N *27/26*; C08K *5/21*; B01K *5/00*

U.S. Cl. 204—180.1 **3 Claims**



1. In a medium for electrophoresis comprising an aqueous polyacrylamide gel formed by crosslinking polymerization of an acrylamide compound and a crosslinking agent in the presence of water and at least one compound having a carbamoyl group, the improvement wherein glycerol is contained in the medium in an amount ranging from 0.3 to 0.8 wt/v %.

4,695,355

ELECTRODE FOR MEMBRANE ELECTROLYSIS

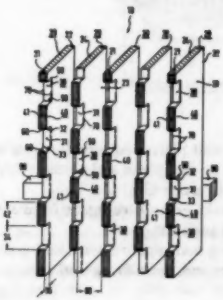
Konrad Koziol, Rötbenbach a.d.Pegnitz, Fed. Rep. of Germany, assignor to Conradty GmbH & Co. Metallelektroden KG, Rothenbach a.d. Pegnitz, Fed. Rep. of Germany

Filed May 13, 1986, Ser. No. 862,818

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519573

Int. Cl.[4] C25B *11/02*

U.S. Cl. 204—252 **33 Claims**



28. A membrane electrolysis cell comprising: a membrane; a first electrode on one side of said membrane; and a second electrode on the other side of said membrane, said first electrode comprising an electrode body having a surface provided at least partially with an electro-catalytically active coating and being formed from a plurality of parallel, mutually spaced lamellas, each lamella having an edge surface for supporting said membrane, on which edge surface is provided a plurality of recesses separated by respective bridge portions not coated for electro-catalytic activity.

4,695,356

ELECTROCHEMICAL PROCEDURE FOR THE DIRECT FORMING OF GENERALLY THIN ELEMENTS WITH VARIOUS CONTOURS AND SURFACES OF USUAL AND TECHNICAL CERAMICS OR REFRACTORY MATERIAL

Henri Vander Poorten, Mons, Belgium, assignor to Andromaque S.A., Luxembourg, Luxembourg

Continuation-in-part of Ser. No. 573,950, Jan. 26, 1984, abandoned. This application Mar. 19, 1986, Ser. No. 841,446

Int. Cl.[4] B01D *57/02*

U.S. Cl. 204—180.9 **26 Claims**

1. A process for producing ceramic tiles which comprises:

providing a plurality of metallic plates, each of an area greater than that of tiles to be produced,

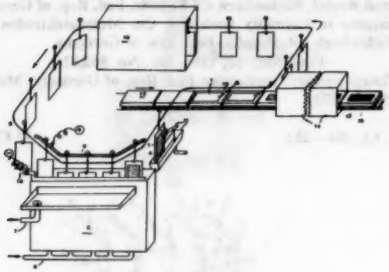
applying to a surface of each of said plates electrical insulating material defining the boundaries of at least one active area of said surface for producing at least one tile,

providing on said surface electrically conductive separating means for temporary adhesion of electrodeposited ceramic material on said active area and subsequent removal of said electrodeposited material from said plate,

transporting said plates sequentially through a bath of finely divided ceramic material suspended in an aqueous electrolyte,

applying an electrical potential of selected value between said plates while in said bath and a counter electrode to produce electrodeposition of ceramic material from said

bath onto said active area of said surface of each of said plates within the boundaries defined by said insulating material, the value and time of application of said potential being selected to build up on said active area of said surface of said plate a deposit of ceramic material having a thickness of from 1 mm to 20 mm,



removing said plates sequentially from said bath with said deposits on said plates and partially drying said deposits to constitute green tiles,

stripping said green tiles intact from said plates onto heat resistant supports,

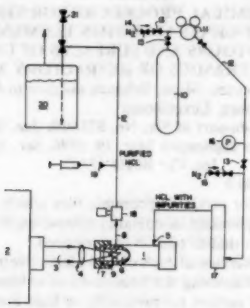
transporting said supports with said green tiles thereon into a furnace and there firing said tiles.

4,695,357

REMOVAL OF UNSATURATED HYDROCARBONS IN ANHYDROUS HYDROGEN HALIDE BY INFRARED LASER RADIATION

Anne S. Boussert, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 25, 1985, Ser. No. 801,258
Int. Cl.[4] B01J *1/10*
U.S. Cl. 204—157.41 **14 Claims**



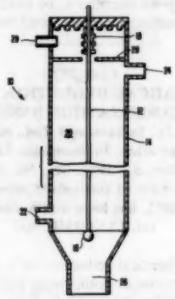
1. A process for converting ethylenically unsaturated hydrocarbons of from 2–3 carbon atoms and acetylene, in anhydrous hydrogen halide containing up to about 4,000 ppm by volume thereof, into one or more reaction products readily separable from the hydrogen halide, comprising subjecting the hydrogen halide containing the organic impurities to laser radiation having a wavelength corresponding to a wavelength at which the impurity absorbs radiation, in an amount effective to achieve dielectric breakdown.

4,695,358

METHOD OF REMOVING SO_2, NO_X AND PARTICLES FROM GAS MIXTURES USING STREAMER CORONA

Akira Mizuno, Toyohashi, Japan, and Judson S. Clements, Tallahassee, Fla., assignors to Florida State University, Tallahassee, Fla.

Filed Nov. 8, 1985, Ser. No. 796,268
Int. Cl.[4] C01B *17/60*
U.S. Cl. 204—174 **49 Claims**



1. A method for converting sulfur dioxide and/or nitrogen oxides in a mixture thereof with at least one other gas to separable forms comprising:

passing said mixture of gass through a streamer corona discharge zone defined by spaced electrodes;

periodically dissipating in said zone pulses of electrical power of sufficiently high voltage to establish therein a continuous pulsed streamer corona discharge whereby the sulfur dioxide and/or nitrogen oxides are converted to acid mist and/or particle aerosols;

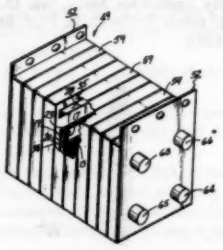
the improvement comprising establishing a streamer corona discharge by applying fast-rising narrow pulses in a zone defined by electrodes spaced in a wire-cylinder or wire-plate geometry.

4,695,359

FILTER PRESS MEMBRANE ELECTROLYTIC CELL WITH DIFFUSION BONDED ELECTRODE ELEMENTS AND ELASTOMERIC FRAMES

Kenneth E. Woodard, Jr., Cleveland, Tenn.; Robert A. Dean, Guilford, Conn.; David L. Fair, Cheshire, Conn., and Julius C. Fister, Jr., Hamden, Conn., assignors to Olin Corporation, Cheshire, Conn.

Filed Jan. 2, 1986, Ser. No. 815,697
Int. Cl.[4] C25B *9/00, 11/02, 11/10*; B23K *31/02*
U.S. Cl. 204—255 **22 Claims**



1. An electrolytic cell for electrolyzing electrolytes having raw materal infeed lines and product outlet lines connected to an electrical power source and having an ion selectively per-

meable membrane separating each adjacent pair of electrodes, comprising in combination:

(a) a plurality of electrode frames with internal surfaces in contact with the electrolytes, the raw material and the product, the electrode frames further having an unfilled central space;

(b) protective liner material lining the internal surfaces to prevent th electrolytes, raw material and product from directly contacting the elastomeric electrode frame;

(c) an electrode subunit fitted within the central space of each electrode frame containing at least one electrode surface, conducting elements and a backplate, the at least one electrode surface being formed of a corrosion resistant material metallurgically bonded by diffusion bonding to the conducting elements to form electrode surface-conducting element joints that do not abrade the adjacent membrane;

(d) a conducting plate mated to the backplate, the backplate further having a conductive coating applied thereto in line with the conducting elements to lower the electrical resistance between the conducting plate and the backplate prior to mating the conducting plate and the backplate, the conducting plate and the backplate further being mated by an adhesive applied to the backplate; and

(e) a coating applied to the at least one electrode surface of each electrode subunit to promote the electrolyzing of the electrolytes.

4,695,360

DEVICE FOR ELECTROCHEMICAL-ETCHING DETERMINATION OF CORROSION RESISTANCE OF METALS

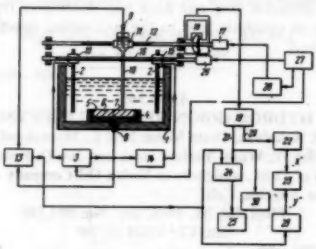
Georgy N. Asatiani; Evgeny A. Pikus; Elgudzha R. Kutelia; David M. Tsivtsivadze; Yason N. Mudzhiri, and Nikolai V. Dzhalabadze, all of Tbilisi, U.S.S.R., assignors to Gruzinsky Politekhnichesky Institute, Tbilisi, U.S.S.R.

Filed Dec. 6, 1985, Ser. No. 805,800

Claims priority, application U.S.S.R., Dec. 6, 1984, 3820850

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—404 **9 Claims**



1. A device for an electrochemical-etching determination of corrosion resistance of metals comprising:

an electrochemical cell including an electrolyte;

first and second polarization electrodes mounted spaced apart in said electrochemical cell, presenting opposing surfaces facing each other;

power supply means with its output electrically connected to said polarization electrodes;

a holder for a sample of a test metal to be tested in said cell, said holder being located between said polarization electrodes and being mounted in said electrochemical cell so that when the test sample is placed thereinto the working surface of said test sample interacting with the electrolyte lies in a position perpendicular to said opposing surfaces of the polarization electrodes;

electric contact means located in said holder for contact with a sample placed therein, and extending to the exterior of the electrochemical cell;

reference electrode means including a capillary probe mounted in said electrochemical cell with said capillary probe terminating adjacent the working surface of the test sample when placed in said holder;

movement means for said reference electrode means to move said capillary probe in a direction perpendicular to said opposing surfaces of the polarization electrodes and along the working surface of said test sample to interact therewith; and

potential meter means interconnected, between said reference electrode means and said electric contact means to generate a signal indicative of the potential difference therebetween.

4,695,361

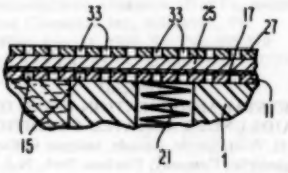
OXYGEN SENSOR

Mark P. Grady, Norristown, Pa., assignor to Seatronics, Inc., Hatboro, Pa.

Continuation-in-part of Ser. No. 794,553, Nov. 4, 1985, abandoned. This application May 19, 1986, Ser. No. 864,492

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—415 **19 Claims**



1. An oxygen sensor, comprising:

(a) means defining a housing,

(b) an anode disposed within the housing, the anode being connected to an anode terminal,

(c) a cathode disposed within the housing, the cathode comprising a perforated metallic disk, the cathode being kept apart from the anode by an insulating separator, the cathode being disposed within a gasket in a recess in the housing,

(d) an electrolyte disposed within the housing and contacting the cathode and anode,

(e) a gas-permeable liquid-impermeable membrane having a diameter substantially equal to that of the gasket, the membrane being disposed adjacent the cathode, on the side of the cathode opposite the anode,

(f) a sintered disk, having a diameter substantially equal to that of the membrane, the sintered disk being disposed adjacent the membrane,

(g) means for holding the membrane and the sintered disk against each other and against the cathode, and

(h) spring means, disposed within a cavity in the housing, the spring means being held in compression between the cathode and a cathode terminal, wherein the electrical connection between the cathode and the cathode terminal is completed by the spring means.

4,695,362

ACID OR ACID SALT WASH OF A METAL CHLORIDE LAYER OF AN ION SELECTIVE ELECTRODE

Thomas R. Kissel, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 813,162, Dec. 24, 1985, abandoned. This application Sep. 25, 1986, Ser. No. 911,560

Int. Cl.[4] G01N *27/46*

U.S. Cl. 204—419 **6 Claims**

1. In a process for making an ion selective electrode selective for chloride, comprising the steps of

(a) forming a layer of silver on a support, and

(b) oxidizing a surface portion of the silver layer with a bath comprising a chlorochromate, to form silver chloride;

the improvement comprising a further step, after step (b), of washing said electrode in an organic acid, inorganic acid, or aqueous solution of a salt of said organic or inorganic acid, provided that

(a) said acid has a pKa <4.0 and a silver solubility product $pK_{sp}<10.0$, in a concentration and for a length of time effective to reduce negative biases created by purine interferences when using an electrode prepared without said further step; and

(b) said salt;

(i) is soluble in water at $\geqq 0.001M$,

(ii) yields an aqueous pH of $\leqq 7.0$, and

(iii) comprises ions that do not dissolve said silver chloride, the cations being univalent or divalent cations only.

4,695,363

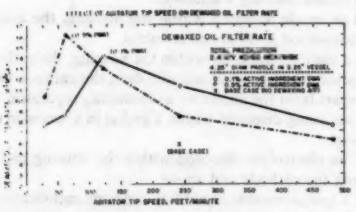
WAX CRYSTAL MODIFICATION USING DEWAXING AIDS UNDER AGITATED CONDITIONS

Theodore H. West, Sarnia, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed May 27, 1986, Ser. No. 867,141

Int. Cl.[4] C10G *73/04*

U.S. Cl. 208—33 **5 Claims**



1. A method for dewaxing waxy hydrocarbon oils by chilling a mixture of waxy oil-dewaxing solvent and dewaxing aid in indirect chilling means to a wax filtration temperature wherein conditions of agitation are maintained in said indirect chilling means by means of paddles in the chilling means extending the length of the chilling means, which paddles do not touch the internal walls of said chilling means, resulting in a gap between the tip of said paddle and the internal wall of the chilling means, wherein said gap ranges from about 0.5 to about 20% of the internal diameter of said chilling means, the paddle being rotated so as to exhibit a tip velocity of about 25 to 400 feet/minute.

4,695,364

LUBE OR LIGHT DISTILLATE HYDRODEWAXING METHOD AND APPARATUS WITH LIGHT PRODUCT REMOVAL AND ENHANCED LUBE YIELDS

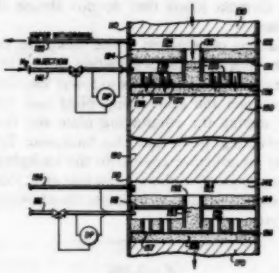
Kenneth R. Graziani, Woodbury; Chwan P. Kyan, Mantua; Stuart S. Shih, Cherry Hill, and Raymond M. Sowiak, Haddonfield, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 685,564, Dec. 24, 1984, Pat. No. 4,648,957. This application Jan. 3, 1986, Ser. No. 816,092

The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.

Int. Cl.[4] C10G *65/02, 65/12*

U.S. Cl. 208—59 **20 Claims**



1. A method for hydrodewaxing a hydrocarbon feedstock comprising the steps of:

(a) passing said hydrocarbon feedstock and hydrogen gas through a dewaxing reactor containing a series of adjacent dewaxing catalyst beds to produce a dewaxed feedstock and olefin-containing vapor, wherein each of said catalyst beds is separated by a collector tray and a distributor tray positioned below said collector tray;

(b) withdrawing said olefin-containing vapors above each said collector tray; and

(c) injecting non-olefinic hydrogen-rich gas between each said collector tray and each said distributor tray to produce an optimum feed to the succeeding dewaxing catalyst bed.

4,695,365

HYDROCARBON REFINING PROCESS

Donald B. Ackelson, Costa Mesa; Eric L. Moorehead, Diamond Bar; John W. Ward, Yorba Linda, and Jon D. Probst, Fullerton, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Jul. 31, 1986, Ser. No. 891,735

Int. Cl.[4] C10J *65/04*

U.S. Cl. 208—89 **116 Claims**

69. A process for reducing the pour point of a fuel oil with minimum degradation of the viscosity thereof, said process comprising:

(1) hydrotreating a sulfur, nitrogen, and hydrocarbon-containing feedstock having an initial boiling point between about 500° and 600° F. and an end point between about 850° and 950° F. in the presence of a particulate hydrotreating catalyst comprising hydrogenation components on a porous refractory oxide support under conditions of elevated temperature and pressure and the presence of hydrogen so as to decrease the sulfur and nitrogen content of said feedstock;

(2) hydrodewaxing at least a portion of the hydrotreated feedstock in the presence of a particulate hydrodewaxing catalyst under conditions of elevated temperature and pressure and the presence of hydrogen so as to produce a hydrocarbon fraction of lower pour point than said fuel

oil, said hydrodewaxing catalyst comprising one or more hydrogenation components on a support comprising at least 70 weight percent of an intermediate pore molecular sieve having cracking activity, and said fraction having a viscosity within about 1.75 centistokes, as measured at 212° F., of the viscosity of the feedstock;

(3) hydrotreating the entire effluent from said hydrodewaxing in the presence of hydrogen and under conditions of elevated temperature and pressure and in the presence of a particulate hydrotreating catalyst comprising one or more hydrogenation components on a porous refractory oxide support;

(4) recovering said fraction from the product of said hydrotreating in step (3); and

(5) blending said fraction with a fuel oil of higher pour point so as to reduce the pour point thereof while not substantially changing the viscosity of the fuel oil.

4,695,366

DESULFURIZATION PROCESS

J. Wayne Miller, and John W. Ward, both of Yorba Linda, Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 680,348, Dec. 11, 1984, Pat. No. 4,582,819. This application Jan. 9, 1986, Ser. No. 817,352

Int. Cl.[4] C10G *61/06*

U.S. Cl. 208—91 **16 Claims**

1. A process for removing sulfur from a hydrocarbon oil, said process comprising contacting said hydrocarbon oil under sulfur-removing conditions with a porous catalytic absorbent comprising copper oxide and a porous refractory oxide prepared by a method comprising admixing a synthetic basic copper carbonate having a sulfur content less than about 0.05 weight percent, calculated as S, with said porous refractory oxide or precursor thereof, forming an extrudable paste, shaping said extrudable paste, drying the shaped extrudable paste, and calcining the dried, shaped, extrudable paste to form said composition.

4,695,367

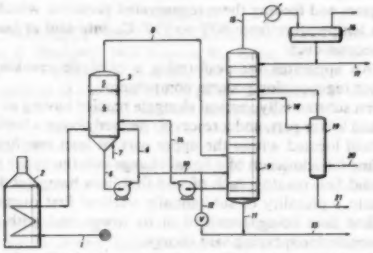
DIESEL FUEL PRODUCTION

Daniel D. Ezernack, Sugarland, and Robert B. Armstrong, Katy, both of Tex., assignors to The M. W. Kellogg Company, Houston, Tex.

Filed Mar. 24, 1986, Ser. No. 843,442

Int. Cl.[4] C09C *1/48*

U.S. Cl. 208—106 **6 Claims**



1. A continuous process for production of diesel range fuel which comprises:

(a) heating virgin hydrocarbon oil having a Conradson carbon content below 2 weight percent and boiling predominantly above 345° C. to incipient cracking conditions and introducing the resulting heated oil to a back-mixed, soaking zone having a vapor zone and a liquid zone, a temperature between 385° C. and 440° C., and a vapor zone pressure between 1.38 and 3.84 kg/cm^2 abs.;

(b) cracking the heated oil in the liquid zone in the absence of added hydrogen to a diesel-rich, overhead vapor portion and a heavy oil liquid portion while maintaining the liquid portion in the soaking zone for an average residence time equivalent to between 1 and 4 hours based on fresh feed and maintaining the overhead vapor portion in the soaking zone for a residence time less than 1 minute;

(c) introducing all of the diesel-rich, overhead vapor portion directly to an intermediate point of a fractionation zone;

(d) recovering a diesel range fuel product from the fractionation zone; and

(e) recovering the heavy oil liquid portion from the soaking zone.

4,695,368

PROCESS FOR PRODUCING HIGH OCTANE GASOLINE

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Jul. 31, 1986, Ser. No. 892,756

Int. Cl.[4] C10G *47/02*

U.S. Cl. 208—111 **43 Claims**

1. A hydrocracking process for producing a high octane gasoline from a hydrocarbon feedstock containing constituents boiling above about 550° F. which comprises contacting said feedstock in the presence of hydrogen and greater than about 200 ppmw ammonia, based on said feedstock, under hydrocracking conditions with a hydrocracking catalyst comprising at least one hydrogenation metal component in combination with a crystalline silicoaluminophosphate molecular sieve having pores defined by 12-membered rings of oxygen atoms.

4,695,369

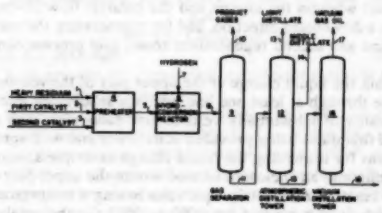
CATALYTIC HYDROCONVERSION OF HEAVY OIL USING TWO METAL CATALYST

Diwakar Garg, Macungie; Edwin N. Givens, Bethlehem, and Frank K. Schweighardt, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Aug. 11, 1986, Ser. No. 895,570

Int. Cl.[4] C10G *45/04, 45/06, 47/02, 47/26*

U.S. Cl. 208—112 **11 Claims**



1. In a process for hydrotreating a heavy hydrocarbon oil feedstock having a boiling point greater than 950° F. and containing asphaltenes and metal contaminants to produce distillate products having a boiling pont less than 950° F., said distillate products having reduced asphaltenes and metal contaminants at low coke formation rates, the improvement comprising contacting said feedstock with a gaseous hydrogen atmosphere at about 700° to 860° F. and 400 to 4,000 psig hydrogen pressure with a nominal reactor residence time of 20 to 180 minutes in the presence of a two dispersed metal compound catalyst system consisting essentially of a first and second dispersed metal compound catalyst component, wherein the first of said dispersed metal compound catalyst component being an oil soluble hydrogenation catalyst having a metal concentration of about 10 to 1,000 ppm, with said metal selected from the group consisting essentially of molybdenum, tungsten, cobalt, nickel, and mixtures thereof, and the second of said dispersed metal compound catalyst being selected from

the group consisting of an oil soluble catalyst and a fine particulate catalyst of less than or equal to 350 U.S. mesh, and said second catalyst having a metal concentration of 0.05 to 1.2 wt.% (500 to 12,000 ppm), with said metal selected from the group consisting essentially of zinc, iron, copper, and mixtures thereof, said concentrations for either catalyst based upon the weight of said feedstock.

4,695,370

PROCESS AND APPARATUS FOR FLUID BED CATALYTIC CRACKING

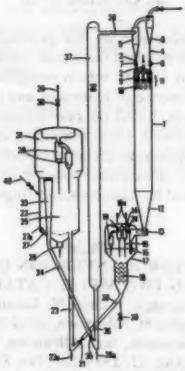
Pierre Galtier, Vienne-Estressin, and Christian Busson, Dardilly, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Aug. 2, 1985, Ser. No. 762,073

Claims priority, application France, Aug. 2, 1984, 84 12388

Int. Cl.[4] C10G *11/18*

U.S. Cl. 208—113 **17 Claims**



1. A process for catalytically cracking a liquid hydrocarbon charge in a fluidized bed reaction zone having an upper and lower part wherein the charge and the catalyst flow co-currently in a downward direction, and for regenerating the catalyst in first and second regeneration zones, said process comprising:

injecting the liquid charge at the upper part of the reaction zone through at least one line which is subdivided into a plurality of substantially vertical first ducts with each of said first ducts being provided at its lower end with spray means for dispensing the liquid charge as droplets, introducing into an enclosure located within the upper part of the reaction zone catalyst particles having a temperature which is in a range from 600° to 950° C., the catalyst particles being introduced through at least one second duct into the enclosure so as to define a catalyst fluidized bed in said enclosure,

circulating a gas through said fluidized bed so as to downwardly drive the catalyst particles of the fluidized bed through a plurality of substantially vertical third ducts thereby introducing the catalyst particles into the reaction zone itself, each vertical first duct being coaxial with one of the third ducts, each means for spraying the liquid charge being juxtaposed with an upper end of said third duct, so as to obtain in said third duct a flow of liquid charge and entrained catalyst particles in order to completely vaporize the liquid charge and intimately admix the charge with the catalyst particles,

maintaining contact in said reaction zone between the liquid charge and the catalyst, with a residence time of the charge from 0.1 to 10 seconds and at a temperature in the range of 450°-700° C. to produce a reaction effluent stream,

increasing the velocity of the catalyst and the reaction effluent in the lower part of the reaction zone, said lower part being funnel shaped and converging

downwardly at a half apex angle ranging from about 5 to 30°,

separating 50 to 90% of the catalyst particles from the reaction effluent stream in a generated spiral within at least one first separation zone having an inlet and outlet and having a residence time lower than one second, the velocity of the gaseous portion of the reaction effluent at the inlet of said first separation zone being from 10 to 40 meters per second so as to produce a helical flow of vapor without reversal of the generated spiral, with the major part of the remaining catalyst particles being driven along with the gaseous effluent and then being separated from the reaction effluent within at least one second separation zone which includes the reversal of a spiral stream generated by the injection of the gaseous flow into said second separation zone,

removing the major part of the hydrocarbons from the catalyst particles by the introduction of a stripping gas,

conveying the catalyst particles upwardly through a fourth duct to a first fluidized bed regeneration zone by means of a first carrier gas,

performing a first catalyst regeneration step, within said first regeneration zone at a temperature T_1 ranging from about 500° to 750° C., with a fluidizing gas which comprises oxygen or a molecular oxygen-containing gas, so as to cause the combustion of at least 90% of the hydrogen and so as to oxidize 10–60% by weight of the carbon present on the catalyst,

removing the major part of the gases from the first regeneration zone,

withdrawing the partially regenerated catalyst from said first regeneration zone, feeding it upwardly through a first transfer line, by means of a second carrier gas comprising a molecular oxygen-containing gas to a lower part of a second regeneration zone, the second regeneration zone having the shape of a substantially vertical and elongate tube having a length L, and diameter ϕ, whose ratio L/O ranges from 3 to 90, the catalyst being further regenerated in the second regeneration zone by being treated with the second carrier gas at temperature T_2 from 650° to 1000° C., with T_2 being higher than T_1, in order to obtain a regenerated catalyst containing no more than 0.04% by weight of coke, the catalyst having this been driven upwardly through the second regeneration zone by means of said second carrier gas, and

withdrawing from the second regeneration zone a gas-catalyst mixture, separating the catalyst particles from the gases and feeding these regenerated particles, which have a temperature from 600° to 950° C., into said at least one second duct.

8. An apparatus for performing a catalytic cracking and catalyst regeneration process comprising:

a first substantially vertical elongate reactor having an upper and lower part, and a reservoir defined above a horizontal wall located within the upper part, at least one first inlet line for admission of a liquid charge into the upper part of said first reactor, each of said first lines being subdivided into a plurality of substantially vertical first ducts, each first duct being provided at its lower end with a first nozzle for spraying said charge,

at least two substantially vertical second inlet lines for introducing the catalyst particles into said reservoir,

at least one distributor of a gaseous fluid, located above said horizontal wall,

a plurality of catalyst particles discharge tubes connecting said reservoir to said first reactor, said discharge tubes being arranged so that each of the first ducts is coaxial with one of the discharge tubes and so that each first nozzle is located in the vicinity of the upper end of a discharge tube, with all of the first nozzles, first ducts and discharge tubes thus defining a contact and mixing zone

for the liquid charge with the catalyst, with the lower part of the reactor including a bottom portion comprising at least one funnel which converges downwardly and has a half apex angle which is in the range from about 5° to 30°,

means defining at least one primary separation zone located beneath the funnel including at least one cyclone separator and at least one first outlet line for the removal of the catalyst particles from said primary separation zone,

means defining at least one secondary separation zone wherein the reaction effluent is separated from the remaining catalyst particles, including at least one second outlet line for the removal of catalyst particles from said secondary separation zone and at least one third outlet line for the removal of the reaction effluent,

means for stripping the catalyst particles by means of a gas introduced through at least one stripping gas inlet line, said means being fed with catalyst through said first and second outlet lines, and a first conduit for conveying catalyst particles discharged from said stripping means,

a first substantially vertical transfer line connected to said first conduit for lifting the catalyst particles supplied through said first conduit, by means of a lifting gas thus conveying the catalyst particles to the inside of a first regeneration vessel, the first regeneration vessel comprising means for supporting a catalyst bed, a regeneration gas feeding line, and means comprising at least one cyclone for separating the gases from the catalyst particles,

a second duct for discharging gases and a third duct for withdrawing the catalyst from the first regeneration vessel,

a second conduit communicating with said third duct for flowing the catalyst downwardly,

a second vertical ascending catalyst transfer line connected at a lower end to said second conduit and also to a lifting gas inlet,

a second substantially vertical tubular reactor for catalyst regeneration, having a length, L, and diameter, 0, whose ratio L/O ranges from 3 to 90, said second reactor including at least one second nozzle for injecting a regeneration gas, wherein said second reactor is connected to an upper end of said second transfer line,

a third conduit for discharging a gas-catalyst mixture from said second reactor and,

a first means for separating the catalyst from the gases, the first separation means comprising at least two cyclone separators, and a fourth conduit for conducting the catalyst from said first separation means into said second inlet lines.

4,695,371

NONAQUEOUS COAL CLEANING PROCESS

Arthur E. Starbuck, 1430 Kirston St., Reno, Nev. 89503

Filed Jul. 26, 1984, Ser. No. 634,751

The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.

Int. Cl.[4] B04C *5/14, 9/00*; F26B *3/00*

U.S. Cl. 209—211 **7 Claims**

1. A method of cyclone cleaning of fine particle coal containing carbonaceous material, ash and pyrites comprising the steps of:

a. demoisturizing the coal by immersing the coal in a non-aqueous drying liquid having a vaporization temperature higher than that of water, the drying liquid being maintained at a temperature exceeding the vaporization temperature of water, whereby water in the coal is vaporized from the coal and drying liquid;

b. transferring the coal to a non-aqueous, agglomerate inhibiting, carrier liquid miscible with the drying liquid, said carrier liquid is comprised of a liquid mixture of a first liquid having a first specific gravity and a second liquid having a second specific gravity different from said first specific gravity, the carrier liquid's specific gravity is adjusted by using a select amount of each of said first and second liquids to yield a carrier liquid specific gravity intermediate said first and second specific gravities, said carrier liquid specific gravity being greater than 1 less than 1.6 selected for effective separation of carbonaceous material from pyrites and ash for a particular coal and wherein the carrier liquid has the characteristic of extracting non-pyrite forms of sulfur from the coal; and,

c. cycloning the coal in the carrier liquid with a compound cyclone, wherein a first stream predominantly consisting of carbonaceous material and liquid is separated from a second stream predominantly consisting of ash, pyrites and liquid.

4,695,372

CONDITIONING OF CARBONACEOUS MATERIAL PRIOR TO PHYSICAL BENEFICIATION

Robert P. Warzinski, Venetia, and John A. Ruether, McMurray, both of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 15, 1986, Ser. No. 863,650

Int. Cl.[4] C10G *17/04*

U.S. Cl. 208—311 **9 Claims**

1. A method of reducing the ash content of a carbonaceous material comprising:

contacting said carbonaceous material with a supercritical fluid selected from the group consisting of methanol and cyclohexane to extract a solute into supercritical phase leaving a solid residuum;

separating the solid residuum into an ash reduced fraction and an ash-enriched fraction in a liquid of specific gravity selected to float the ash-reduced fraction and to permit the ash-enriched fraction to sink;

recovering the solute and ash-reduced fraction as product.

4,695,373

EXTRACTION OF HYDROCARBON-CONTAINING SOLIDS

Phillman N. Ho, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 694,009, Jan. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 599,480, Apr. 12, 1984, abandoned. This application Jan. 31, 1986, Ser. No. 824,832

Int. Cl.[4] C10G *1/00, 1/04*

U.S. Cl. 208—428 **21 Claims**

1. A process for recovering hydrocarbon liquids from oil shale solids which comprises:

(a) contacting said oil shale solids with a hot, nonoxidizing gas in the substantial absence of an added liquid organic solvent at a temperature between about 550° F. and about 900° F., wherein said solids are contacted with said hot gas at a pressure below the critical pressure of said gas and in the substantial absence of added ammonia and added amines;

(b) contacting the heated oil shale solids from step (a) with a liquid organic solvent in an extraction zone by passing said solvent downwardly through said solids in the substantial absence of an aqueous phase at a temperature between about ambient temperature and about 600° F. in the presence of an added amine under conditions such that hydrocarbons are extracted from said solids, said added amine being selected from the group consisting of (1) a primary alkylamine having the formula R_1NH_2 where R_1 is a straight or branched chain alkyl radical having from 1 to 10 carbon atoms, a substituted or unsubstituted cycloalkyl radical having from 5 to 12 carbon atoms, or a substituted or unsubstituted bicycloalkyl radical having from 9 to 18 carbon atoms, (2) a diamine having the formula $NH_2—R_2—NH_2$ where R_2 is a straight or branched chain alkyl radical having from 2 to 12 carbon atoms, (3) pyrrolidine and (4) N-methylaniline; and

(c) recovering said extracted hydrocarbons from said organic solvent as said hydrocarbon liquids.

4,695,374

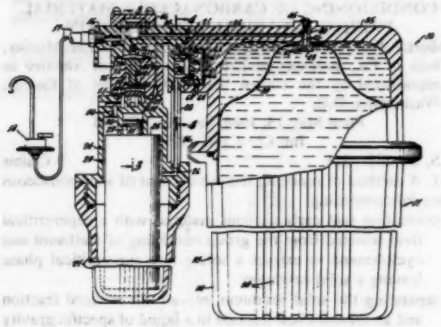
Patent Not Issued For This Number

4,695,375

SELF-CONTAINED HYDRAULICALLY OPERABLE WATER PURIFIER

Truman V. Tyler, 1440 Northwood Rd., Apt. 242A, Seal Beach, Calif. 90740

Filed May 27, 1986, Ser. No. 867,800
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—110 **36 Claims**



1. A water purifier comprising

a filter chamber,

a reverse-osmosis filter membrane in said filter chamber, said reverse-osmosis filter membrane having a cylindrical exterior surface, a tank,

movable means in said tank dividing said tank into two chambers of variable volume,

the first of said chambers being adapted to receive pure water,

the second of said chambers being adapted to receive unpurified water,

a water inlet adapted for connection to a source of tap water under pressure,

a first water passageway for conducting tap water from said inlet to said filter chamber so that a portion thereof can be purified by passing through said reverse-osmosis filter membrane, and another portion can remain unpurified,

a first water outlet adapted for connection to a pure water line having a valve therein for tansmission to a location of consumption,

a second water passageway for conducting pure water from said filter chamber to said first chamber of said tank, and from said first chamber of said tank to said first water outlet, a second water outlet,

a third water passageway for conducting unpurified water from said filter chamber to said second outlet,

and to said second chamber of said tank for forcing purified water out of said first chamber of said tank to said first water outlet,

control valve means for controlling the flow of tap water in said first water passageway, the flow of pure water in said second water passageway, and the flow of unpurified water in said third water passageway,

control passageway means connected to said second water passageway for transmitting the pressure in said second water passageway to said control valve means for effecting automatic operation thereof entirely in response to the pressure of said pure water,

said filter chamber including a first part fixed relative to said tank and defining one end portion of said filter chamber, and a second part rotatably coupled to said first part for permitting separation of said second part from said first part for removal and replacement of said reverse-osmosis filter membrane, one end of said reverse-osmosis filter membrane being received in said first part and the opposite end of said reverse-osmosis filter membrane being received in said second part, such that a portion of the circumference of said reverse-osmosis filter is exposed upon such separation of said second part from said first part, for facilitating removal and replacement of said reverse-osmosis filter membrane,

said reverse-osmosis filter membrane having an axially projecting outlet at said one end thereof for discharging pure water therefrom,

said first part of said filter chamber including a tubular section receiving said projecting outlet of said reverse-osmosis filter membrane, whereby pure water is discharged into said tubular section,

said second water passageway being connected to said tubular section for receiving pure water therefrom,

said third water passageway being connected to said first part of said filter chamber outside of said tubular section for receiving unpurified water,

said first water passageway being connected to said first part of said filter chamber at a location relative to said one end of said filter membrane which is axially inward of said connection of said third water passageway to said first part, and

an annular seal around said reverse-osmosis filter membrane and engaging the wall of said first part of said filter chamber,

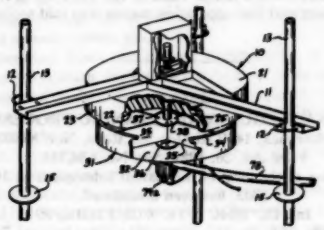
said annular seal being between said connection of said third water passageway and said connection of said first water passageway to said first part of said filter chamber for separating the same.

4,695,376

FLOATING DECANTER

Gordon L. Astrom, Mount Morris, Ill.; Ronald J. Weis, South Beloit, Wis., and Wesley M. Shubert, Ames, Iowa, assignors to Aqua-Aerobic Systems, Inc., Rockford, Ill.

Filed Oct. 20, 1986, Ser. No. 920,760
Int. Cl.[4] B01D *17/00*
U.S. Cl. 210—122 **13 Claims**



1. A floating decanter apparatus comprising, float means for buoyantly supporting the decanter apparatus in a body of liquid and having an underside, a decanter receptacle disposed below the float means and having an open top surrounded by a peripheral upper decanter rim and outlet means for decanted liquid communicating with said decanter receptacle at a level below said decanter rim, discharge means communicating with said outlet means for discharging decanted liquid from the decanter receptacle, means mounting the decanter receptacle on the float means for movement toward and away from the underside of the float means, seal means operative when the decanter receptacle is moved toward the float means to a preselected raised position for sealing the decanter rim to the underside of the float means sufficient to at least substantially prevent flow of liquid from the body of liquid into the decanter receptacle, and power operated actuator means mounted on

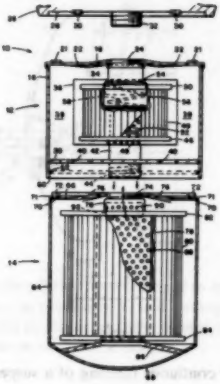
the float and operatively connecting to the decanter receptacle for selectively moving the decanter receptacle from a lower position in which the decanter rim spaced below the underside of the float means to said preselected raised position to seal the decanter rim to the underside of the float means.

4,695,377

FLUID FILTER HAVING SEPARABLE ELEMENTS

Frank W. Medley, III, 45 E. 10th St., Cookesville, Tenn. 38501

Filed Aug. 25, 1986, Ser. No. 899,924
Int. Cl.[4] B01D *27/08*
U.S. Cl. 210—132 **11 Claims**



11. An oil filter for attachment to an engine oil filter base having a threaded engine nipple, an annular seal base, an engine outlet disposed between said threaded nipple and said annular seal base for transmitting oil under pressure to the filter, and an engine inlet disposed within said nipple for receiving oil from said filter, comprising:

a first can having an upper end plate;

a threaded aperture disposed in said upper end plate for receiving and sealing with said engine nipple;

seal ring means disposed on said upper end plate for sealingly engaging the annular seal base when said threaded nipple is threaded onto said engine nipple;

a first oil inlet formed in said upper end plate between said aperture and seal ring means;

said threaded aperture defining a first oil outlet;

a lower end plate formed on said first can;

a lower annular seal base formed on said lower end plate;

a lower threaded nipple extending from said lower end plate and being concentrically disposed with respect to said lower annular seal base;

a second oil outlet disposed in said lower end plate between said lower nipple and said lower annular seal base;

a second oil inlet disposed within and defined by said lower threaded nipple;

outer oil passage means for transmitting oil from said first oil inlet to said second oil outlet;

inner oil passageway means for transmitting oil from said second oil inlet to said first oil outlet;

first oil filter means disposed in one of said inner and outer oil passageway means for filtering oil as it passes therethrough;

a second can having a connection plate;

a second threaded aperture disposed in said connection plate for receiving and sealing with said lower nipple;

second annular seal ring means disposed on said connection plate for sealingly engaging said lower annular seal base when said lower nipple is threaded onto said second threaded aperture;

a third oil inlet formed in said second can;

said second threaded aperture defining a third oil outlet;

third oil passageway means for transmitting oil from said third oil inlet through said second can to said third oil outlet; and

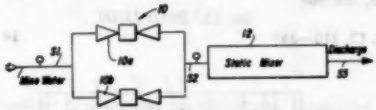
second oil filter means disposed in said third oil passage means for filtering oil flowing therethrough.

4,695,378

ACID MINE WATER AERATION AND TREATMENT SYSTEM

Terry E. Ackman, Finleyville, and John M. Place, Bethel Park, both of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 7, 1984, Ser. No. 669,155
Int. Cl.[4] C02F *1/66, 1/72*
U.S. Cl. 210—198.1 **5 Claims**



1. An in-line areation and treatment system for acid mine water having metallic components therein, said system having no moving parts and comprising:

at least one jet pump capable of entraining air having no moving parts and which utilizes Venturi action to operate, each of said at least one jet pumps having a first inlet for receiving acid mine water having metallic components, a second inlet opened to atmosphere for receiving air to be entrained with the mine water, and a diffuser outlet section for discharging aerated treated mine water in a high velocity stream;

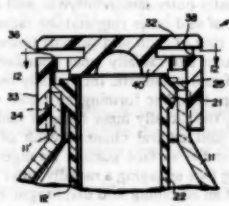
and a static mixer fluidly connected to the outlet section of said at least one jet pump for receiving the aerated mine water, said mixer having an internal helical element therein to force the treated acid mine water from the at least one jet pump to flow through a helical path and out a discharge, thereby further assisting in the aeration thereof and the increasing of the oxidation rates for the metals present in the acid mine water.

4,695,379

WATER TREATMENT APPARATUS

John E. Nohren, Jr., St. Petersburg, and Richard T. Downes, Clearwater, both of Fla., assignors to Innova/Pure Water Inc., Clearwater, Fla.

Filed Jan. 24, 1986, Ser. No. 822,238
Int. Cl.[4] B01D *27/02*
U.S. Cl. 210—282 **21 Claims**



1. In combination with a bottle having a neck with an interior surface and an exterior surface:

an elongated tube having first and second ends, said first end

having means for operatively connecting said tube to said interior surface of said bottle neck;

water treatment means disposed within the interior of said tube for treating water passing through said tube; and

cap means for cooperating with the exterior surface of said neck and closing off said tube first end while allowing passage of liquid from within the bottle between the tube and the neck so that it may flow out of the bottle.

4,695,380

DIAPHRAGM-EQUIPPED FLUID TREATING APPARATUS

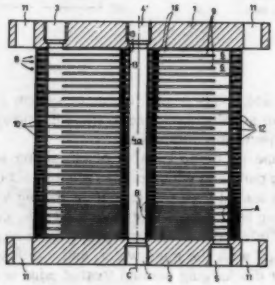
Walter Hilgendorff, Tespe; Gerhard Kahn, and Jürgen Kaschemekat, both of Geesthacht, all of Fed. Rep. of Germany, assignors to GKSS Forschungszentrum Geesthacht GmbH, Geesthact, Fed. Rep. of Germany

Filed Mar. 3, 1986, Ser. No. 835,210

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507908

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—347 **14 Claims**



1. In a fluid treating apparatus having a longitudinal axis; means defining a plurality of chambers arranged in a stack along said axis; a first and a second end plate bounding the stacked chambers at opposite axial ends thereof; an inlet port in said first end plate for introducing into the apparatus a fluid to be treated; an outlet port in said second end plate for withdrawing fluid from the apparatus; means defining a central channel extending along said axis for withdrawing from the apparatus a fluid extract; a plurality of fluid-impervious diaphragms situated in a spaced relationship in said chambers in an orientation generally perpendicular to said axis; the fluid being guided along said diaphragms generally radially relative to said axis; the improvement comprising

(a) a plurality of support frames arranged in a stack along said axis; each said support frame including an outer ring and an inner ring surrounded by said outer ring; said outer ring and said inner ring each having a radially inner face and a radially outer face relative to said axis; the radially inner face of said outer ring and the radially outer face of said inner ring of each said support frame together define radially outer and radially inner boundaries, respectively, of each of said chambers; the radially outer faces of said outer rings together forming an outer wall face of the apparatus, the radially inner faces of said inner rings surrounding said central channel; each of said outer ring having a radial surface portion arranged to constitute a supporting face engaging a radially outer marginal surface portion of an adjoining said diaphragm; each said support frame comprising a grid situated between said outer and inner rings thereof; each grid being preponderantly out of contact with adjoining said diaphragms; and

(b) each said diaphragm having a central aperture in axial alignment with each said inner ring and means for constraining the fluid under treatment to flow along said diaphragms substantially along their entire width measured transversely to said axis.

4,695,381

FILTER FOR CONTINUOUS FILTERING OF A SUSPENSION UNDER PRESSURE

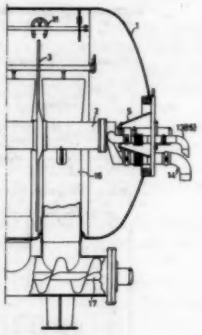
Samuel Ragnegard, Hedemora, Sweden, assignor to AB Hedemora Verkstader, Hedemora, Sweden

Filed May 2, 1986, Ser. No. 858,769

Claims priority, application Sweden, May 2, 1985, 8502122

Int. Cl.[4] B01D *33/08*

U.S. Cl. 210—403 **8 Claims**



1. Filter for contiuous filtering of a suspension under pressue, comprising:

a pressure vessel;

a rotatable filter element arranged in the pressure vessel, for each revloution said filter element passing a filtering cycle having a plurality of filtering zones in liquid phase and gaseous phase;

filtrate channels connected between the filter elements and seprate filtrate outlets from the pressure vessel for each filtering zone;

means in the gaseous phase zone for removing filter cake received during the filtering on the filter elements;

means for discharging removed filter cake from the pressure vessel;

means for effecting required difference pressure over the filter elements;

means for independently controlling the difference pressure over the filter elements in each filtering zone, said control means further being arranged to maintain a lower difference pressure in the liquid phase zone than in the gas phase zone for controlling the difference pressurs over the filter elements in the filtration zones in gas phase and liquid phase independent of each other and wherein a lower difference pressure in the liquid phase zone than in the gas phase zone is maintained.

4,695,382

COMBINED FLUID FILTER AND DELIVERY TUBING

James J. Cronin, Mission Viejo, Calif., assignor to Microgon, Inc., Laguna Hills, Calif.

Filed Nov. 18, 1985, Ser. No. 799,318

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—436 **13 Claims**

1. A combined inline final filter and tubing unit for the filtration and administration of intravenous fluids or the like comprising:

a. a nonporous intravenous tubing member;

b. microporous hollow filter fibres arranged within said tubular member parallel to the longitudinal direction

thereof, said fibres being closed at one end thereof and open at the opposite ends thereof;

c. flow blocking material arranged around said fibres for blocking flow through said tubing member other than through said hollow fibres; and,

d. at least one hydrophobic fibre arranged to extend into said tubing member in proximity to said microporous hollow filter fibres, said hydrophobic fibre having an end thereof in communication with the atmosphere.

4,695,383

PERMSELECTIVE MEMBRANE

Shigeji Konagaya; Osamu Watanabe, both of Ootsu; Hideshi Kuzumoto, Shiga; Masaya Tokai, Takatsuki; Haruhiko Narusawa, Ootsu, and Yasuo Kato, Shiga, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

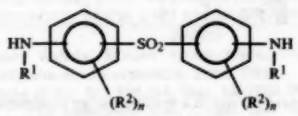
Filed Mar. 5, 1987, Ser. No. 22,624

Claims priority, application Japan, Mar. 12, 1986, 61-55597; Apr. 17, 1986, 61-88697; Apr. 17, 1986, 61-88698

Int. Cl.[4] B05D *5/00*

U.S. Cl. 210—500.37 **20 Claims**

1. A permselective membrane consisting mainly of a copolyamide prepared by the reaction of an aromatic polycarboxylic acid component with a mixed diamine component comprising a diaminodiphenylsulfone compound of the general formula (I),



(I)

wherein R^1 represents hydrogen atom or a C_1–C_{12} hydrocarbon group, R^2s may be the same or different, each representing a monovalent organic group, and n represnets an integer of 0 or 1 to 3, and an alicyclic diamine compound containing two secondary amino groups in the same or different ring(s), the molar ratio of the diaminodiphenylsulfone compound to alicyclic diamine being 95/5 to 35/65.

4,695,384

METHOD FOR IMPROVING THE PHOSPHORUS ELIMINATION CAPACITY OF A LAKE

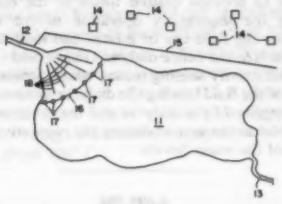
Wilhelm K. Ripl, Berlin, Fed. Rep. of Germany, and Bo L. Verner, Saltsjo Boo, Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Nov. 13, 1986, Ser. No. 930,307

Claims priority, application Sweden, Nov. 13, 1985, 8505383

Int. Cl.[4] C02F *3/32*; C12N *1/12*

U.S. Cl. 210—602 **1 Claim**



1. A method of improving the phosphorus elimination capacity of a lake (**11**) by restricting sedimentation of algae to a minor portion of the lake which comprises; extending a flexidle wall (**16**) from the bottom (**21**) of the lake (**11**) a substantial distance toward the surface (**23**) of the lake and between the boundaries of the lake on either side of an inlet channel (**12**) at the beginning of the vegetation period of the lake to separate the lower parts of a minor portion of the lake from the lower parts of the rest of the lake, positioning a number of sheets (**18**) between the inlet channel (**12**) and the flexible wall (**16**) as growth areas for algae, feeding phosphorus containing water to said inlet channel, and lowering the flexible wall (**16**) around the end of the vegetation period of the lake to allow the flushing away of sedimented algae from the bottom of said minor portion.

4,695,385

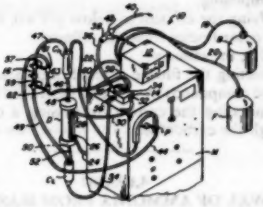
DIALYZER REUSE SYSTEM

James T. Boag, Evergreen, Colo., assignor to Colorado Medical, Inc., Evergreen, Colo.

Filed Apr. 29, 1985, Ser. No. 728,204

Int. Cl.[4] B01D *13/01*; B08B *3/04*

U.S. Cl. 210—636 **12 Claims**



1. A reuse device for automatically cleaning, disinfecting and testing a hemodialysis machine, dialyzer and blood tubing set when connected together as an operational dialysis system, the reuse device comprising:

(a) a power supply connected to a suitable source of electrical power;

(b) fluid tubing means having valve means for controlling fluid flow through the device;

(c) a pair of reservoirs of concentrated cleaning solution and disinfecting solution connected to the valve means in said tubing means;

(d) a logic circuit means connected to said power supply and having a connected read only memory storage means which has been programmed to perform a desired reuse operation cycle;

(e) said logic circuit means having input means for initiating the start of the operation cycle of the reuse device and output means connected to a control means;

(f) a control means being sequentially driven by the logic circuit means to select and drive a plurality of suitable latching circuits and indicator means for operating the valve means for controlling the flow of cleaning and disinfecting fluids at the proper time during the cycle so that the concentrated solutions will be drawn from the device to provide desired fluids to the dialysis system during the sequentialy operation of the reuse device whereby the fluid can be diluted and used to clean, rinse and sterilize the entire dialysis system; and

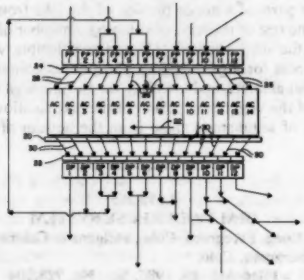
(g) a conductivity sensing means which senses the conductivity of the fluid leaving the dialyzer system for verifying the integrity of the dialyzer and the presence of the correct fluid in the system during the respective operational cycle of the reuse device.

4,695,386

PROCESS FOR THE DECOLORIZATION OF PULP MILL PROCESS STREAMS

W. Wes Berry, Lakeland, Fla., assignor to Advanced Separation Technologies Incorporated, St. Petersburg, Fla.

Filed May 20, 1985, Ser. No. 735,762
Int. Cl.[4] C02F *9/00*
U.S. Cl. 210—665 **23 Claims**



1. A process for the decolorization of pulp mill effluent streams comprising:

(a) acidifying the effluent to below pH 4.0, thereby precipitating color bodies from the effluent;

(b) filtering the effluent;

(c) conducting the filtrate through a carbon bed to adsorb organic compounds from the effluent onto the carbon; and

(d) regenerating the carbon by passing a caustic solution through the carbon bed.

4,695,387

REMOVAL OF AMMONIA FROM WASTEWATER

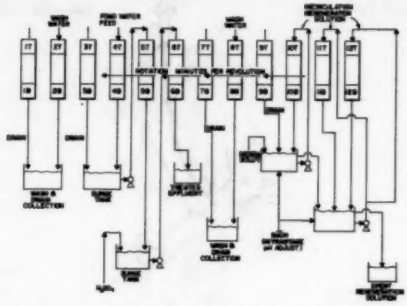
W. Wes Berry, and William R. Erickson, both of Lakeland, Fla., assignors to Advanced Separation Technologies Incorporated, St. Petersburg, Fla.

Filed May 7, 1985, Ser. No. 731,281
Int. Cl.[4] C02F *1/42*
U.S. Cl. 210—676 **13 Claims**

1. A process for the continuous removal of ammonia from wastewater comprising the steps of:

(a) providing a plurality of zeolite-filled chambers moving about a circular path sequentially in periodic fluid communication with a stationary adsorption stage feed port and a stationary regeneration stage feed port as well as corresponding stationary adsorption stage and regeneration stage discharge ports at an end of said chambers opposite to said respective feed ports;

(b) adsorbing ammonium ions onto the zeolite by supplying a solution containing ammonium ions to a first stationary feed port, said solution being delivered in sequence to said plurality of zeolite-filled chambers to form an ammonium-loaded zeolite and an interaction product comprising wastewater with substantially reduced amounts of ammonium, said interaction product being discharged through a first adsorption stage discharge port for entry into a second stationary adsorption stage feed port;



(c) regenerating ammonia from said zeolite filled chambers by supplying an alkaline regeneration fluid to said stationary regeneration stage feed port, said regeneration fluid being delivered in sequence to said plurality of chambers containing said ammonium-loaded zeolite and effecting desorption of a substantial portion of the ammonium ions from said ammonium-loaded zeolite by ion exchange conversion of the ammonium ions to ammonia;

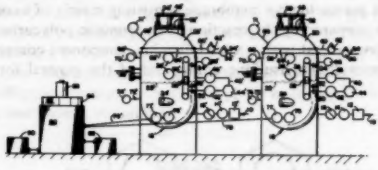
(d) repeating said steps (b) and (c).

4,695,388

APPARATUS AND PROCESS FOR RAPID SEWAGE SLUDGE SEPARATION

Charles A. Long, Jr., Birmingham, Ala., assignor to Long Enterprises, Inc., Birmingham, Ala.

Continuation-in-part of Ser. No. 650,960, Sep. 14, 1984, Pat. No. 4,582,612, which is a continuation-in-part of Ser. No. 560,058, Dec. 9, 1983, Pat. No. 4,487,699. This application Apr. 14, 1986, Ser. No. 851,600
Int. Cl.[4] C02F *1/78*
U.S. Cl. 210—760 **13 Claims**



1. An apparatus for use in a sewage sludge treatment system comprising means for enhancing the surface area of the sludge to be treated and its interaction with a pressurized oxygen-rich atmosphere to produce a treated sludge with absorbed and dissolved gas and means for rapidly removing the treated sludge from a lower portion of a vessel for subsequent rapid sludge separation releasing the absorbed and dissolved gas from the treated sludge,

the means for enhancing the surface area of the sludge and

its interaction with a pressurized oxygen-rich atmosphere including a hyperbaric vessel including a sludge inlet means for conveying sludge to the vessel to be accumulated in a lower portion of the vessel, a sludge delivery means having a discharge end for delivering sludge particles from the lower portion to an upper portion of the vessel, oxygen inlet means for delivering oxygen to the upper portion of the vessel to oxygenate the sludge particles at a hyperatmospheric pressure therein to produce the treated sludge, the oxygenated treated sludge particles falling to and being collected in the lower portion of the vessel, gas outlet means for removing gas from the upper portion of the vessel,

the means for rapidly releasing absorbed and dissolved gas from the treated sludge including a treated sludge outlet means for rapidly removing the oxygenated treated sludge from the lower portion of the vessel using the pressurized oxygen as a propellant, the sludge outlet means comprising a discharge pipe connected to the lower portion of the vessel for conducting sludge to a separation apparatus maintained at a lower pressure than the pressure in the vessel, and a rapidly opening valve means controlling flow of the oxygenated sludge through the discharge pipe.

8. A process for treating sewage sludge comprising: enhancing the surface area of the sludge and its interaction with a pressurized oxygen-rich atmosphere and to rapidly remove treated sludge from a vessel for subsequent rapid sludge separation by the steps of

(a) delivering particles of the sludge to an upper portion of a hyperbaric vessel containing a pressurized oxygen-rich atmosphere where the particles interact with the oxygen to form oxygenated sludge containing absorbed and dissolved gas;

(b) collecting the oxygenated sludge particles containing absorbed and dissolved gas within a lower portion of the vessel; and

(c) rapidly releasing the absorbed and dissolved gas from the oxygenated sludge by removing the oxygenated sludge rdpidly from the vessel through a discharge pipe to a separation apparatus as a result of a pressure differential created between the hyperbaric vessel and the separation apparatus at a pressure lower than the pressure in the hyperbaric vessel.

4,695,389

AQUEOUS GELLING AND/OR FOAMING AGENTS FOR AQUEOUS ACIDS AND METHODS OF USING THE SAME

Gregory Kubala, Broken Arrow, Okla., assignor to Dowell Schlumberger Incorporated, Tulsa, Okla.

Division of Ser. No. 590,284, Mar. 16, 1984, Pat. No. 4,591,447. This application Mar. 7, 1986, Ser. No. 837,488

Int. Cl.[4] E21B *43/27*

U.S. Cl. 252—8.553 **13 Claims**

1. A buffered gelling/foaming agent for gelling aqueous inorganic acid solutions comprising:

(a) a N,N-bis(2-hydroxyethyl) fatty amine acetic acid salt;

(b) an alkali metal acetate salt; and

(c) acetic acid; and functioning as a buffer reactant;

(d) water.

4,695,390

REACTION PRODUCT OF POLYALRYLENE-SUBSTITUTED POLYCARBOXYLIC ACID ACYLATING AGENT, POLYAMINE AND SULFOLENE AS A DISPERSANT

Frederick W. Koch, Willoughby Hills, and Joseph W. Plalet, Euclid, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jan. 4, 1985, Ser. No. 688,785

Int. Cl.[4] C10M *1/20, 1/32, 1/38*

U.S. Cl. 252—47.5 **40 Claims**

1. An oil soluble dispersant composition comprising:

the reaction product of (A) at least one polycarboxylic acid acylating agent having at least one polyalkene substituent having an Mn value of about 300 to about 5000 and a Mw value of about 500 to about 2000 with (B) a polyamine and (C) a sulfolene, said acylating agents having within their structure an average of at least 0.5 acylating groups for each equivalent weight of said polyalkene group, said reaction being conducted at a temperature from about 15° C. to about 300° C.

4,695,391

MODIFIED SUCCINIMIDES (IX)

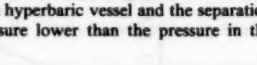
Thomas F. Buckley, Hercules, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 820,457, Jan. 17, 1986, abandoned. This application Sep. 4, 1986, Ser. No. 904,086

Int. Cl.[4] C10M *133/44*

U.S. Cl. 252—51.5 A **51 Claims**

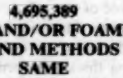
1. A product produced by the process which comprises contacting at a temperature sufficient to cause reaction a polyamino alkenyl or alkyl succinimide having at least one primary or secondary amino group with a compound of the Formula V:



V

wherein R_4 is selected from the group consisting of a divalent hydrocarbyl of from 2 to 30 carbon atoms with the proviso that the hydrocarbyl carbon atom bound to one

group is not also bound to the other



group and $—R_5—OR_5—_p$ wherein R_5 is alkylene of from 2 to 5 carbon atoms and p is an integer of from 1 to 100; X is selected from the group consisting of bromo, chloro and $—OR_6$ wherein R_6 is selected from the group consisting of alkyl of from 1 to 6 carbon atoms, phenyl and phenyl substituted with 1 to 2 substituents selected from the group consisting of chloro, bromo, nitro, alkyl of from 1 to 6 carbon atoms and trifluoromethyl; and m is independently an integer of from 0 to 1 and wherein the molar charge of the compound of Formula V to the basic nitrogen of the polyamino alkenyl or alkyl succinimide is from about 0.1:1 to about 0.5:1.

4,695,392

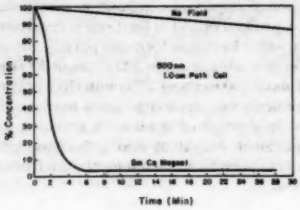
MAGNETIC PARTICLES FOR USE IN SEPARATIONS

Roy A. Whitehead, Hingham; Mark S. Chagnon, Lowell; Ernest V. Groman, Brookline and Lee Josephson, Arlington, all of Mass., assignors to Advanced Magnetics Inc., Cambridge, Mass.

Division of Ser. No. 493,991, May 12, 1983, Pat. No. 4,554,088. This application Jun. 13, 1985, Ser. No. 744,434

Int. Cl.[4] C08F *283/12;* **H01F** *1/00;* **C09D** *5/23*

U.S. Cl. 252—62.54 **11 Claims**



1. A magnetically-responsive particle comprising a magnetic metal oxide core generally surrounded by a silane coat to which molecules can be covalently coupled, a mass of the particles being dispersable in aqueous media to form an aqueous dispersion having (a) a fifty-percent-turbidity-decrease settling time of greater than about 1.5 hours in the absence of a magnetic field, and (b) a ninetyfive-percent-turbidity-decrease separation time of less than about 10 minutes in the presence of a magnetic field, the magnetic field being applied to the aqueous dispersion by bringing a vessel containing a volume of the dispersion into contact with a pole face of a permanent magnet, the permanent magnet having a volume which is less than the volume of the aqueous dispersion in the vessel.

4,695,393

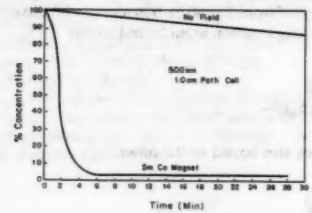
MAGNETIC PARTICLES FOR USE IN SEPARATIONS

Roy A. Whitehead, Hingham; Mark S. Chagnon, Lowell; Ernest V. Groman, Brookline and Lee Josephson, Arlington, all of Mass., assignors to Advanced Magnetics Inc., Cambridge, Mass.

Division of Ser. No. 493,991, May 12, 1983, Pat. No. 4,554,088. This application Jun. 13, 1985, Ser. No. 744,435

Int. Cl.[4] C08F *283/12;* **G01N** *33/00*

U.S. Cl. 252—62.54 **12 Claims**



1. A process for preparing magnetically-responsive particles which comprises:

(a) precipitating divalent and trivalent transition metal salts in base to form a precipitate;

(b) washing the precipitate in water to approximate neutrality;

(c) washing the precipitate in an electrolyte;

(d) suspending the washed precipitate in an organic solvent containing about 1% (V/V) water to form a mixture;

(e) adding an acidic solution of a silane monomer to the mixture of step (d);

(f) homogenizing the resultant mixture of steps (d) and (e) at high speed;

(g) adding to the homogenized mixture of steps (d), (e), and (f) a wetting agent, which agent is miscible in the organic solvent and water;

(h) heating the resultant mixture of steps (d), (e), (f), and (g) to a temperature which is: (i) at or above the boiling point of the organic solvent and the boiling point of water, such that the organic solvent and water are evaporated; (ii) below the boiling point of the wetting agent, such that the wetting agent is not evaporated; and (iii) sufficient to polymerize the silane monomer and to cause the resultant silane polymer to become adsorptively or covalently bound to the precipitate; and

(i) washing the wetting agent from the silanized precipitate, which precipitate comprises silane-coated magnetically-responsive particles with mean diameters between about 0.1μ and 1.5μ as measured by light scattering, a mass of the particles being dispersable in aqueous media to form an aqueous dispersion having (a) a fifty-percent-turbidity-decrease settling time of greater than about 1.5 hours in the absence of a magnetic field, and (b) a ninety-five-percent-turbidity-decrease separation time of less than about 10 minutes in the presence of a magnetic field, the magnetic field being applied to the aqueous dispersion by bringing a vessel containing a volume of the dispersion into contact with a pole face of a permanent magnet, the permanent magnet having a volume which is less than the volume of the aqueous dispersion in the vessel.

4,695,394

THICKENED AQUEOUS CLEANSER

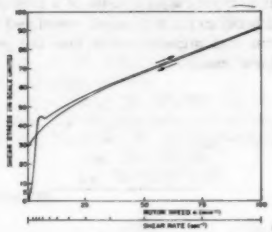
Clement K. Choy, Walnut Creek; Frederick I. Keen, Manteca; Aram Garabedian, Newark, and Colleen J. Spurgeon, Walnut Creek, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Continuation-in-part of Ser. No. 727,702, Apr. 26, 1985, which is a continuation of Ser. No. 603,266, Apr. 20, 1984, Pat. No. 4,599,186. This application May 30, 1985, Ser. No. 739,377

The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.

Int. Cl.[4] C11D *9/20, 9/12, 3/395*

U.S. Cl. 252—97 **34 Claims**



1. An aqueous hard surface abrasive scouring cleanser characterized by compliance with environmental requirements for being substantially free of phosphate components, comprising:

(a) a colloidal alumina thickener having an average particle size, in dispersion, of no more than about one micron, the colloidal alumina thickener forming about one to fifteen percent by weight of the cleanser;

(b) a non-phospate electrolyte/buffer forming about 1 to 25 percent by weight of the cleanser;

(c) a surfactant system including two surfactant components, one surfactant component comprising a fatty acid anionic surfactant, the other surfactant component comprising a selected bleach-stable surfactant, the surfactant system forming about 0.1 to 15% by weight of the cleanser;

(d) a halogen bleach forming about 0.1 to 5 percent of the cleanser;

(e) a particulate abrasive having an average particle size of about one to as much as 400 microns to provide scouring

action, the particulate abrasive forming about 5 to 70 percent by weight of the cleanser.

3. The cleanser of claim 1 wherein the electrolyte/buffer is a silicate.

4,695,395

CLEANING COMPOSITIONS WITH SKIN PROTECTION AGENTS

Michael L. Caswell, Memphis, Tenn.; James J. Corr, Huntington, N.Y.; Mark S. Dobrovolny, Edison, N.J.; Lynn H. Lander, Harrington Park, N.J.; William R. Narath, Parsippany, N.J., and Richard F. Theiler, Harrington Park, N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 654,291, Sep. 25, 1984, abandoned. This application Jul. 16, 1986, Ser. No. 886,575

Int. Cl.[4] C11D *9/32, 17/00*

U.S. Cl. 252—121 7 Claims

1. A toilet bar composition consisting essentially of:

(a) from 30 to 70% alkali metal fatty acid soap;

(b) from about 2 to 15% of sodium isethionate;

(c) from 1% to 15% C_{12}–C_{18} free fatty acid; and

(d) from 5% to 45% sodium C_8–C_{18} acyl isethionate, the amount of acyl isethionate being no greater than the amount of soap present.

4,695,396

TWO-COMPONENT ALKALINE CLEANING COMPOSITIONS AND METHODS OF PREPARING AND USING SAME

Christian Rossmann, Langenfeld; Horst Fluechter, Kaarst; Gerald Schreiber, Duesseldorf, and Winfried Wichelhaus, Mettmann, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 7, 1986, Ser. No. 827,291

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504172

Int. Cl.[4] C11D *11/00*

U.S. Cl. 252—135 18 Claims

1. In a method for manufacturing a two-component alkaline cleaner composition having a pH greater than 11, said composition comprising a mixture of

component (A) a strongly alkaline alkali metal hydroxide solution, and

component (B) an aqueous silicic acid dispersion concentrate containing an anionic, nonionic or amphoteric tenside, a detergent builder, and a stabilizer, the improvement comprising

forming said silicic acid in situ in said concentrate dispersion by precipitating it from an alkali metal silicate maintained at a pH of about 8 to 11, which is reacted at least one (a) mineral acid or (b) gas which reacts acidically in said silicate solution; and

mixing said components.

4,695,397

GRANULAR BLEACHING ACTIVATOR

Karl Sommer, Palzing; Robert Heinz, Mannheim; Albert Hettche, Hessheim; Johannes Perner, Neustadt; Werner Schuster, Boehl-Iggelheim, and Wolfgang Trieselt, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 772,209, Sep. 5, 1985, abandoned, which is a continuation of Ser. No. 421,098, Sep. 22, 1982, abandoned. This application Sep. 15, 1986, Ser. No. 907,161

Claims priority, application Fed. Rep. of Germany, Sep. 28, 1981, 3138551; Mar. 6, 1982, 3208216

Int. Cl.[4] C09K *3/00;* C11D *3/395*

U.S. Cl. 252—182 2 Claims

1. A process for the preparation of a granular bleaching activator, which comprises:

(a) homogeneously mixing the powdered components of said granular bleaching activator consisting of (1) from 75 to 95 parts by weight of at least one bleaching activator selected from the group consisting of pentaacetylglucose, pentapropionylglucose, tetraacetylethylenediamine, tetracetylglycoluril, carboxylic acid anhydrides, salts of mixed anhydrides and phenol esters, (2) from 2.5 to 15 parts by weight of at least one water-swellable assistant selected from the group consisting of starch, crosslinked polyvinylpyrrolidone and starch ethers, and (3) from 2.5 to 10 parts by weight of at least one inorganic or organic builder and/or dispersant selected from the group consisting of sodium sulfate, sodium carbonate, alkali metal salts or alkaline earth metal salts of phosphoric acid, oligomeric phosphoric acids, polymeric phosphoric acids, alkali metal salts or alkaline earth metal salts of nitrilotriacetic acid, alkali metal salts or alkaline earth metal salts of ethylenediaminetetraacetic acid, alkali metal salts or alkaline earth metal salts of polyacrylic acid, the alkali metal salts or alkaline earth metal salts of copolymers of maleic acid with acrylic acid or vinyl ethers, one of said organic acids in free form, and carboxymethylcellulose without the presence of water;

(b) compacting said mixture by feeding said mixture by means of a feed screw into the gap between two counter-rotating rolls;

(c) comminuting the compactate obtained; and

(d) isolating the particles of compactate obtained having a size ranging from 0.5 to 3 mm.

4,695,398

CYCLOHEXANE DERIVATIVE

Yasuyuki Goto; Tetsuya Ogawa, both of Yokohama, and Shigeru Sugimori, Fujisawa, all of Japan, assignors to Chisso Corporation, Osaka, Japan

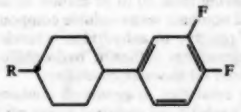
Filed Mar. 12, 1986, Ser. No. 838,630

Claims priority, application Japan, Mar. 12, 1985, 60-48549

Int. Cl.[4] C09K *19/54, 19/30;* C07C *25/13*

U.S. Cl. 252—299.5 10 Claims

1. A cyclohexane derivative having the formula



(I)

wherein R represents an alkyl group of 1 to 10 carbon atoms.

2. A liquid crystal composition having at least two components at least one of which is a compound expressed by the formula (I) set forth in claim 1.

4,695,399

METHOD OF MAKING A CONTACT LENS MATERIAL WHICH MAY BE IDENTIFIED BY COLORED FLUORESCENCE

Charles W. Neefe, 811 Scurry St., P.O. Box 429, Big Spring, Tex. 79720

Continuation-in-part of Ser. No. 857,177, Apr. 29, 1986, Pat. No. 4,632,773. This application Sep. 30, 1986, Ser. No. 913,453

The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.

Int. Cl.[4] C09K *11/02*

U.S. Cl. 252—301.35 19 Claims

1. A method of making a contact lens material which is identifiable from similar contact lens materials by the step of selecting a colored fluorescent dye in solid state solution in a transparent organic resin adding the selected fluorescent colored dye in the amount of from 0.0002 to 0.009 parts by weight to the lens monomer mixture, polymerizing the lens monomer mixture to form a solid contact lens blank, making a contact lens from the solid contact lens blank, placing the contact lens

convex surface on a dark surface, in the absence of visible light irradiating the lens with ultraviolet light, allowiong the colored fluorescent light emanating from within the lens to be concentrated at the lens edge by reflecting between the lens polished optical surfaces, allowing the colored fluorescent light to exit the lens at the lens edge, identifying the lens material by observing the selected color of the fluorescent colored light visible at the lens edge.

4,695,400

TERNARY ALLOY AND OIL SLURRY THEREOF

Alfred R. Globus, 26-53 210th St., Bayside, N.Y. 11360

Division of Ser. No. 753,455, Jul. 10, 1985, Pat. No. 4,581,130, which is a continuation-in-part of Ser. No. 652,898, Sep. 21, 1984, Pat. No. 4,601,817. This application Dec. 19, 1985, Ser. No. 810,790

Int. Cl.[4] B01J *13/00*; **C22C** *24/00*

U.S. Cl. 252—309 **2 Claims**

1. A ternary alloy consisting essentially of sodium, copper, and lead, wherein said copper is present in an amount of 1–4% and said lead is present in an equal or slightly larger amount.

2. A ternary alloy according to claim 1 in the form of a slurry in oil.

4,695,401

NONIONIC EMULSIFIER AND SUBSTITUTED SUCCINIC ANHYDRIDE COMPOSITIONS THEREWITH

W. Alan Sweeney, Larkspur, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 449,324, Dec. 13, 1982, abandoned. This application Dec. 27, 1985, Ser. No. 814,351

Int. Cl.[4] B01J *13/00*; **B01F** *17/36*

U.S. Cl. 252—312 **18 Claims**

8. A stable hydrocarbyl-substituted succinic anhydrid/nonionic emulsifier composition comprising:

(a) 70 to 99.5% of a normally liquid hydrocarbyl-substituted succinic anhydride having from 10 to 30 carbon atoms in the substituent; and

(b) 0.5 to 30% of a water-soluble emulsifier comprising the reaction product of a hydrocarbyl-substituted succinic anhydride having from 10 to 30 carbon atoms in the substituent and a nonionic water-soluble compounds having 1 to 3 groups reactive to anhydrides, wherein said water-soluble compund has sufficient hydrophilic strength to give a balanced oil-in-water emulsifier;

and wherein the emulsifier so produced contains a free carboxyl group and a substituted carboxyl group per each reacted anhydride molecule.

18. The composition according to claim 8, wherein the composition is in the form of an aqueous emulsion.

4,695,402

ORGANOPHILIC CLAY GELLANTS AND PROCESS FOR PREPARATION

Claude M. Finlayson, Cranbury; Charles A. Cody, Robbinsville; Steven J. Kemnetz, Trenton; William W. Reichert, Freehold; Edward D. Magauran, Mount Holly, and Johnny R. Johnson, Freehold, all of N.J., assignors to NL Chemicals, Inc., New York, N.Y.

Filed Aug. 20, 1985, Ser. No. 767,599

Int. Cl.[4] B01J *13/00*

U.S. Cl. 252—315.2 **87 Claims**

1. A process for preparing an organophilic clay gellant comprising:

(a) subjecting a slurry of smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of clay to high shear conditions whereby clay agglomerates are separated, said smectite-type clay having been previously treated to remove non-clay impurities;

(b) reacting the smectite-type clay with organic cation in an amount ranging from about 90 to about 150% of the cation exchange capacity of the smectite-type clay whereby at least some of the cation exchange sites of the smectite-type clay are substituted with organic cation thereby forming an organiphilic clay gellant;

(c) separating the organophilic clay gellant from the slurry; and

(d) drying the organophilic clay gellant under conditions selected such that the temperature of the wet organophilic clay gellant does not exceed about 50° C.

4,695,403

THICK FILM CONDUCTOR COMPOSITION

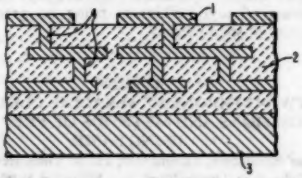
Tsutomu Nishimura, Uji; Seiichi Nakatani, Neyagawa; Satoru Yuhaku, Osaka, and Toru Ishida, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 17, 1986, Ser. No. 875,083

Claims priority, application Japan, Jun. 17, 1985, 60-131104; Jun. 18, 1985, 60-132290; Jun. 20, 1985, 60-134542; Jun. 20, 1985, 60-134547

Int. Cl.[4] H01B *1/00*

U.S. Cl. 252—513 **13 Claims**



1. A thick film conductor composition comprising an inorganic ingredient and an organic vehicle, wherein said inorganic ingredient comprises 80–98 wt% of copper oxide, and 2–20 wt% of at least one metal selected from the group consisting of Pt, Pd and Ni which metals are capable of forming a homogeneous solid solution with copper.

4,695,404

HYPERCONDUCTIVE FILLED POLYMERS

Chung T. Kwong, Pennington, N.J., assignor to Amerasia International Technology, Inc., Trenton, N.J.

Filed Apr. 7, 1986, Ser. No. 848,783

Int. Cl.[4] H01B *1/02*

U.S. Cl. 252—514 **6 Claims**

1. A polymeric composition in the form of paste, liquid, or preformed film, comprising a polymeric binder and silver particles evenly distributed in said binder, said binder being prepared from a processable liquid polymer, said silver particles comprising at least 95% pure silver and having a volume electrical resistivity in the compressed free flow state of not more than 0.0002 ohm-cm, said composition having a stable volume electrical resistivity of 0.0001 ohm-cm or less.

4,695,405

PROCESS FOR QUENCHING FLUORESCENCE, AND NEW CATIONIC OR AMPHOTERIC AROMATIC NITRO COMPOUNDS

Horst Harnisch, Much, and Edgar Siegel, deceased, late of Leverkusen, Fed. Rep. of Germany (by Gabriele, E. Helena-Maria Siegel, heiress), assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 10, 1985, Ser. No. 721,818

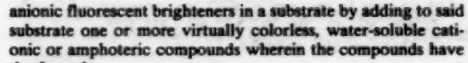
Claims priority, application Fed. Rep. of Germany, Apr. 21, 1984, 3415103.6

Int. Cl.[4] G03C *1/00*

U.S. Cl. 252—600 **7 Claims**

1. A process for quenching the fluoresence produced by

anionic fluorescent brighteners in a substrate by adding to said substrate one or more virtually colorless, water-soluble cationic or amphoteric compounds wherein the compounds have the formula



wherein

$K^{\oplus 1}$ stands for $E^{\oplus 1}$- or A—X^1—Y^1—Z^1—$E^{\oplus}$—,

A stands for a benzene, biphenyl, naphthalene, furan, benzofuran, thiophene, benzothiophene, thiazole, benzothiazole, benzimidazole, 1,3,4-thiadiazole or indole radical which, in addition to nitro, can also be substituted by C_1–C_4-alkyl, halogen, carbamoyl, sulphamoyl, cyano, hydroxyl, C_1–C_4-alkoxy or a sulpho group,

X^1 stands for $-(CH_2)_r-CO-$, $-CH_2-Y^1-CO-$, $-(CH_2)_r-SO_2-$, $-O-CH_2-CO-$, $-O-CH_2-SO_2-$, $-S-CH_2-CO-$, $-S-CH_2-SO_2-$ or a single bond,

t stand for 0, 1 or 2,

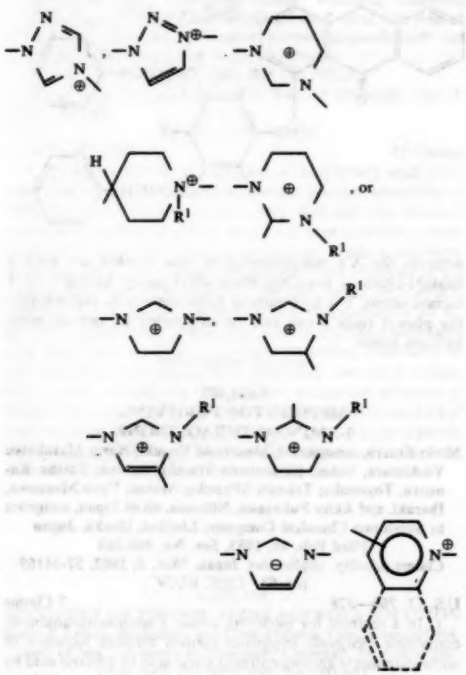
X^2 stands for —CO—, —CO—NH—CO—, $-SO_2-$ or a single bond,

Y^1 and Y^2 each stand for —O—, —S—, —N(R)—, —N(-R)—NH— or a single bond,

R stands for hydrogen, C_1–C_2-alkyl or cyanoethyl or, in Y^1 and Y^2, also for —CO— or $-SO_2-$, each of which can be bonded to the o- or periposition of A or of a benzene ring W,

Z^1 and Z^2 each stand for C_1–C_6-alkylene, p-benzylene, p-xylylene or a single bond,

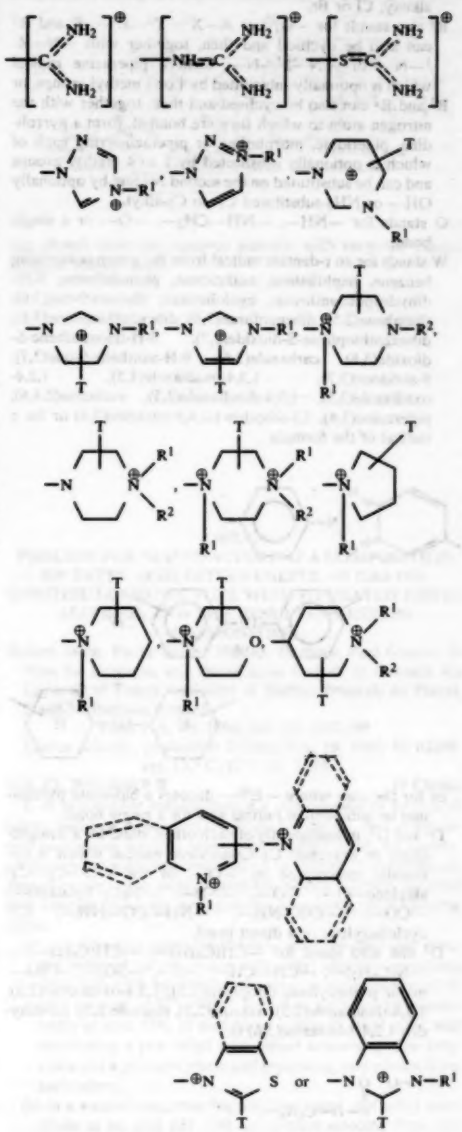
$E^{\oplus}$ stands for $-N^{\oplus}(R^1R^2)-$,



wherein

these rings can be optionally substituted by 1–4 methyl groups, and each of the two free valencies can be bonded to $-X^1-Y^1-Z^1-$ or to $-Z^2-Y^2-X^2-G-$,

$E^{\oplus 1}$ stands for $-N^{\oplus}(R^1R^2R^2)$,



T stands for hydrogen or—depending on the nature of the ring—for 1–4 methyl groups,

wherein

the aromatic radicals, in addition to 1 or 2 nitro groups, can also be substituted by C_1–C_{14}-alkyl, halogen, cyano or carbamoyl and the amidinium, guanidinium and thiuronium radicals can also be substituted by 1–2 R^2 radicals,

R^1 and R^2, independently of each other, stand for hydrogen, C_1–C_4-alkyl, which can be substituted gy OH, NH_2, halogen, C_1–C_4-alkoxy, COOH, $CONH_2$, CN or C_1–C_4-alkoxycarbonyl, C_2–C_4-alkenyl, cyclohexyl, phenyl-C_1–C_3-alkyl or benzoylmethyl which, in addition to nitro, can

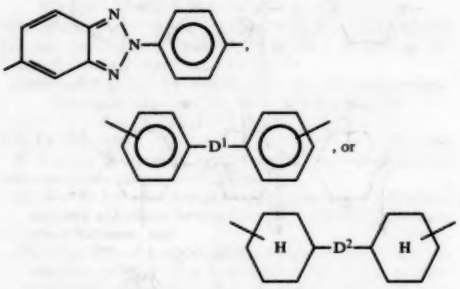
each also be ring-substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, Cl or Br,

R^1 also stands for —O]$^{\ominus}$ or A—X^1—Y^1—Z^1—, R and R^1 can also be cyclised and then, together with —N—Z^1—N— or —N—Z^2—N—, form a piperazine radical which is optionally substituted by 1 or 2 methyl groups, or

R^1 and R^2 can also be cyclised and then, together with the nitrogen atom to which they are bonded, form a pyrrolidine, piperidine, morpholine or piperazine ring each of which is optionally substituted by 1 to 4 methyl groups and can be substituted on the second N atom by optionally OH— or NH_2-substituted C_1- to C_3-alkyl,

G stands for —NH—, —NH—CH_2—, —O— or a single bond,

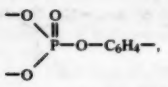
W stands for an r-dentate radical from the group comprising benzene, naphthalene, anthracene, phenanthrene, 9,10-dihydrophenanthrene, cyclohexane, fluoren-9-one(3,6), thiophene(2,5), dibenzofuran(3,6), dibenzothiophene(3,6), dibenzothiophene-S-dioxide(2,7), 9-H-thioxanthene-S-dioxide(3,6), carbazole(3,6), 9-H-xanthene-9-one(2,7), 9-acridone(2,7), 1,3,4-oxadiazole(2,5), 1,2,4-oxadiazole(3,5), 1,3,4-thiadiazole(2,5), s-triazine(2,4,6), piperazine(1,4), 1,2-dihydro-1,2,4,5-tetrazine(3,6) or for a radical of the formula



or for the case where —E$^{\oplus}$— denotes a bidentate pyridinium or quinolinium radical also for a single bond,

D^1 and D^2, independently of each other, stand for a straight-chain or branched C_1–C_7-alkylene radical which is optionally interrupted by —O—, or for —O—C_2—C_4-alkylene—O—, —O—, —NH—, —N(C_1–C_2-alkyl)—, —CO—, —CO—NH—, —NH—CO—NH—, 1,1-cyclohexylene or a direct bond,

D^1 can also stand for —CH(C_6H_5)—, —CH(C_6H_4—)—, —N(C_6H_5)—, —CH=CH—, —S—, —SO_2—, —SO—, m- or p-phenylene, thiophene(2,5), 1,3,4-oxadiazole(2,5), 1,3,4-thiadiazole(2,5), oxazole(2,5), thiazole(2,5), 1,2-dihydro-1,2,4,5-tetrazine(3,6) or



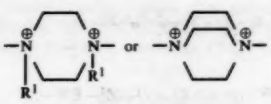
D^2 can also stand for —CH(C_6H_{11})— or —CH(C_6H_{10}—)—, where the rings mentioned under W, D^1 and D^2, in addition to nitrogen, can also be substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen and/or a sulpho group,

n stands for an integer from 1 to 6, a stands for the number of anionic and/or N$^{\oplus}$—O$^{\ominus}$ groups and correspondingly for 0, 1, 2 or 3,

r stands for 2 or 3 and is ≧a, and An^-, if present, stands for a colourless anion,

and wherein the chains occurring r times can be identical or different,

and wherein in the case of r=2 the grouping —E$^{\oplus}$—Z^2—Y^2—X^2—G—W—G—X^2—Y^2—Z^2—E$^{\oplus}$— as a whole can also stand for



4,695,406

ANTHRAQUINONE COMPOUNDS AND THE PRODUCTION AND USE THEREOF

Roger Lacroix, Huningue; Jean-Marie Adam, Saint-Louis, both of France, and Janos Vincze, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

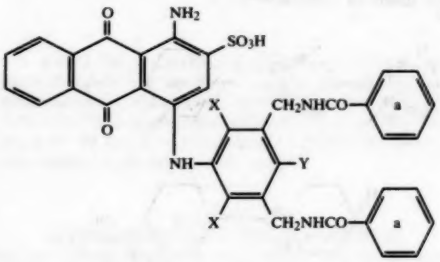
Continuation of Ser. No. 647,872, Aug. 31, 1984, abandoned, which is a continuation of Ser. No. 305,661, Sep. 25, 1981, abandoned, which is a division of Ser. No. 166,277, Jul. 7, 1980, Pat. No. 4,309,180, which is a continuation of Ser. No. 963,627, Nov. 24, 1978, abandoned. This application May 31, 1985, Ser. No. 740,295

Claims priority, application Luxembourg, Nov. 28, 1977, 78597

Int. Cl.[4] *C07C 143/665*

U.S. Cl. 260—372 **6 Claims**

1. An anthraquinone compound which, in the form of the free acid, corresponds to the formula I



(I)

wherein the X's independently of one another are each a straight-chain or branched-chain alkyl group having 1 to 4 carbon atoms, Y is hydrogen or is the same as X, and wherein the phenyl rings a can also be substituted by one or more halogen atoms.

4,695,407

METHOD FOR PURIFYING 1-AMINOANTHRAQUINONE

Norio Kotera, Amagasaki; Masatoshi Uegaki, Nara; Masakatsu Yoshimura, Sakai; Shinzaburo Masaki, Ashiya; Tatsuo Kaneoya, Toyonaka; Takashi Miyaoka, Minoo; Yuzo Maegawa, Ibaraki, and Akira Fukasawa, Niihama, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Feb. 15, 1983, Ser. No. 466,568

Claims priority, application Japan, Mar. 3, 1982, 57-34169

Int. Cl.[4] *C07C 97/24*

U.S. Cl. 760—378 **7 Claims**

1. In a method for purifying crude 1-aminoanthraquinone containing inorganic impurities formed through nitration of anthraquinone with concentrated nitric acid or a mixed acid by rectification, the improvement comprising reducing said inorganic impurities to not more than 4 wt. % as converted to ash basis or reducing the iodine-consuming reductive inorganic impurities to not more than 2 wt. % as converted to consumed iodine basis prior to said rectification.

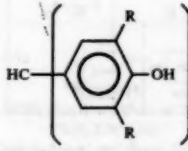
4,695,408

PREPARATION OF TRISPHENOL METHANES

Kuo Y. Chang, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jul. 2, 1985, Ser. No. 751,342
Int. Cl.[4] C09B 11/06
U.S. Cl. 260—395 17 Claims

1. A process comprising contacting a 2,6-disubstituted phenol with salicylaldehyde under reaction conditions such that there is formed a product represented by the formula:



wherein each R independently is alkoxy, aryloxy, or alkyl of up to about 10 carbon atoms; or H or halo.

4,695,409

CONTROL OF DISALT IN α-SULFOFATTY ACID ESTER SURFACTANTS

Robert Piorr, Ratingen-Hoesel; Guenter Panthel, Haan; Karl H. Schmid, Mettmann; Dietmar Colignon, Erkrath; Hans J. Rommerskirchen, Duesseldorf-Eller; Wolfgang Schmidt, Monheim, and Horst Ritterbex, Dusseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 10, 1985, Ser. No. 753,304
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1984, 3432324
Int. Cl.[4] C07C 143/90
U.S. Cl. 260—400 11 Claims

1. A process for the preparation of α-sulfofatty acid alkyl esters having a low disalt content which consists essentially of sulfonation of a fatty acid alkyl ester with less than about 2 moles of SO_3 per mole of fatty acid alkyl ester to obtain a crude α-sulfofatty acid alkyl ester, contacting the crude α-sulfofatty acid alkyl ester and SO_3 reaction product with about 0.8 to 1.3 mole equivalents of at least one alcohol, based on the SO_3 which is not used for α-sulfonation, at a temperature of 40° C. to 150° C. to react free alcohol and transeserify the α-sulfofatty acid alkyl ester to obtain a product consisting essentially of transesterified α-sulfofatty acid alkyl ester and alkyl sulfate, followed by working-up said product in aqueous medium to bleach said product or to neutralize said α-sulfofatty acid alkyl ester, or both, with the proviso that the alcohol is an aliphatic C_1–C_3-monoalcohol and the same alcohol present in the fatty acid alkyl ester is used for transesterification.

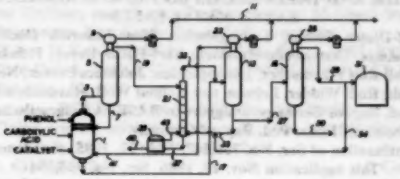
4,695,410

RECOVERY OF PHENOL FROM AQUEOUS SOLUTION

Gary J. Lynch, Bridgeton, and Chen-Hsyong Yang, Chesterfield, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 29, 1986, Ser. No. 901,681
Int. Cl.[4] C07F 5/8; C07C 37/68, 69/7
U.S. Cl. 260—410.5 10 Claims

1. In a process for producing a phenyl ester wherein a carboxylic acid is reacted with phenol and water is removed from the reaction product resulting in the formation of an aqueous solution of phenol, the improvement which comprises extract-



ing phenol from the aqueous solution with recycled phenol stripped phenyl ester.

4,695,411

PROCESS FOR MANUFACTURING A COMPOSITION OF FATTY ACID ESTERS USEFUL AS GAS OIL SUBSTITUTE MOTOR FUEL WITH HYDRATED ETHYL ALCOHOL AND THE RESULTANT ESTERS COMPOSITION

Robert Stern, Paris; Gérard Hillion, Herblay; Paul Gateau, St Nom La Breteche, and Jean-Claude Guibet, St Germain En Laye, all of France, assignors to Institut Francais du Petrol, Rueil-Malmaison, France

Filed Feb. 18, 1986, Ser. No. 830,169
Claims priority, application France, Feb. 15, 1985, 85 02340
Int. Cl.[4] C11C 3/04, 3/10
U.S. Cl. 260—410.9 R 17 Claims

1. A process for manufacturing a composition of fatty acid esters, useful as motor fuel substitute for gas oil, said composition comprising a major proportion of ethyl esters, by transesterification of a starting material oil or grease of vegetable or animal origin, or a mixture thereof, which starting material may contain free acids, said process comprising the following steps:

(a) in a first acid transesterification step, reacting said starting material oil or grease with ethyl alcohol containing from 1 to 60% by weight of water, in the presence of an acid catalyst, at 70°–150° C. for a time sufficient to transesterify at least 75% of said oil or grease to ethyl ester, and recovering a raw ethyl ester phase containing free fatty acids and a glycerol phase and separating said phases from each other,

(b) in a second step, reacting said separated raw ethyl ester phase at an acid pH with an alcohol selected from the group consisting of methanol, ethanol, propanol and butanol and simultaneously distilling water from the reaction mixture, so as to form additional ester from said free fatty acids present in said separated raw ethyl ester phase, while decreasing the content of said free fatty acids to at most about 2% by weight of said raw ethyl ester phase,

(c) in a third step, reacting resultant reaction product of said second step with at least one aliphatic, linear or branched monoalcohol of 1 to 5 carbon atoms in the presence of a basic catalyst, thereby further reducing the content of said free fatty acid in the product of step (b) and forming a purified composition of fatty acid esters.

4,695,412

PREPARATION OF ACYLOXYBENZENESULFONIC ACIDS AND THEIR ALKALI METAL AND ALKALINE EARTH METAL SALTS

Wolf-Dieter Balzer, Ludwigshafen; Hans-Heinrich Bechtolsheimer, Dittelsheim-Hessloch; Karl-Heinz Beyer, Frankenthal; Rolf Fikentscher, Ludwigshafen; Johannes Perner, Neustadt; Rudi Widder, Leimen, and Helmut Wolf, Hassloch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

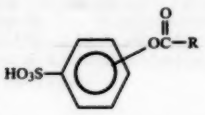
Continuation of Ser. No. 736,847, May 22, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 933,354

Claims priority, application Fed. Rep. of Germany, May 26, 1984, 3419795

Int. Cl.[4] C07C *143/52*

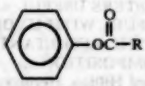
U.S. Cl. 260—507 R **9 Claims**

1. A process for the preparation of alkali metal or alkaline earth metal salts of an acyloxybenzenesulfonic acid of the formula I



(I)

where R is straight-chain or branched saturated alkyl of 5 to 11 carbon atoms, by sulfonation of a phenyl ester, wherein a phenyl ester of the formula II



(II)

where R has the meanings given for formula I, in the presence of from 0.2 to 30 mole %, based on SO_3 or chlorosulfonic acid, of a complexing agent for SO_3 or chlorosulfonic acid, is sulfonated with SO_3 or chlorosulfonic acid at from 20° to 80° C., the molar ratio of phenyl ester to SO_3 or chlorosulfonic acid being about 1:1, the resulting acyloxybenzenesulfonic acid is subsequently acylated at 40°–50° C. with an acyl chloride of the formula Cl—COR, where R has the meanings stated for formula II, said acyl chloride being in an equimolar amount based on the free phenolic OH groups present, and the acyloxybenzenesulfonic acid obtained is then neutralized to give the alkali metal or alkaline earth metal salt, said neutralization being effected by combining the resulting liquid acyloxybenzenesulfonic acid of the formula I with an aqueous solution of an alkali metal or alkaline earth metal hydroxyde, carbonate or bicarbonate in water at from 0° to 60° C., with thorough mixing, so that a pH of from 3.0 to 5.5 is maintained, and, if required, the aqueous solution of the latter is subjected to oxidative bleaching before drying.

4,695,413

PROTECTIVE CIRCUIT FOR A HACKER TYPE DC CONVERTER

Folke J. B. Ekelund, Norsborg; Per O. Lilja, Västerhaninge; Roland J. E. Wald, Skärholmen, and Matts F. Stahl, Älvajö, all of Sweden, assignors to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

PCT No. PCT/SE85/00461, § 371 Date Jun. 30, 1986, § 102(e) Date Jun. 30, 1986, PCT Pub. No. WO86/03349, PCT Pub. Date Jun. 5, 1986

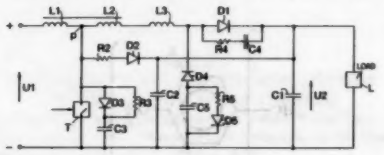
PCT Filed Nov. 18, 1985, Ser. No. 884,290

Claims priority, application Sweden, Nov. 19, 1985, 8405816

Int. Cl.[4] H02H *7/10*

U.S. Cl. 361—18 **7 Claims**

1. A hacker type D.C. converter circuit comprising a supply voltage source, a series circuit including a first coil (L1), a first diode (D1) and a first capacitor (C1), said series circuit being connected to the supply voltage source (U1), controllable switching means, a connection junction between said first coil and first diode, a further diode (D3) and capacitor (C3) coupled across said switching means, said first capacitor including a first terminal remote from said further diode and a second terminal proximate said further diode and an impedance means, said connection junction (p) between the first coil (L1) and the first diode (D1) being connected to the first terminal of the first



capacitor (C1) remote from the further diode through said impedance means across said controllable switching means (T), which periodically alternates between open and closed states, the series circuit between said connection junction (p) and the first diode (D1) further including an inductive element (L3) and a second coil (L2) which is inductively connected to the first coil (L1), and a second diode (D2) connected in a parallel circuit from the connection junction (p) and across the first diode (D1) to the first capacitor.

4,695,414

METHOD AND APPARATUS FOR PRESSING POWDER MATERIAL

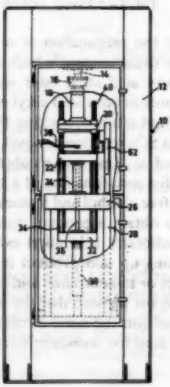
Alf Forslund, and Goran Andersson, both of Harnosand, Sweden, assignors to Convey Teknik AB, Harnosand, Sweden

Filed Jun. 29, 1984, Ser. No. 625,953

Claims priority, application Sweden, Jul. 1, 1983, 8303796

Int. Cl.[4] C06B *21/00*

U.S. Cl. 264—3.1 **4 Claims**



1. A method for pressing powder material with a press, the press including a stationary punch, a movable punch, and a movable die, the method comprising the steps of:

dosing the powder material into the die;

pressing the powder material between the stationary punch and the movable punch until a predetermined position of the movable punch is reached;

stopping the movable punch when the predetermined punch position is reached;

sensing an actual value of force on the movable punch when the predetermined punch position is reached;

after the stopping and sensing steps, comparing the actual value of punch force with a preselected criterion;

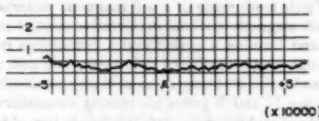
rejecting the pressed powder material if the actual value of punch force deviates from the preselected criterion by more than a predetermined amount; and

moving the die relative to the stationary punch to withdraw the pressed powder material.

4,695,415
METHOD FOR PRODUCING ACRYLIC FIBER PRECURSORS

Takashi Setsuie; Takeji Otani, and Kanji Yoshida, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jan. 24, 1985, Ser. No. 694,302
Int. Cl.[4] D01F 9/22
U.S. Cl. 264—29.2 **9 Claims**



2. A method for producing an acrylic fiber precursor for carbon fibers substantially free of defects from fusion bonding or agglutination, said acrylic fiber comprising an acrylonitrile polymer containing at least 90% by weight of acrylonitrile and having a surface roughness of 2.0 to 3.0, the surface roughness being measured in the following manner:

a secondary electron line scanning profile of the acrylic fiber precursor is prepared by a scanning electron microscope at a magnification of 6,600 times, which is magnified to 10,000 times to obtain a line scanning profile in which each distance of 5 cm, corresponding to 5μ in actual measurement, the left and right from the zero level of the line scanning taken as the center are divided into ten equal length and heights of respective divided profiles in the directions of the y-axis, and read, and a variance of the heights is calculated according to formula (1) and an arithmetic mean value of the variances obtained on fifty specimens is taken as the surface roughness,

$$\text{Variance} = \sqrt{\frac{1}{20}\sum_{i=1}^{20}(yi - \bar{y})^2} \quad (1)$$

wherein yi is the height of the profile at a particular division in the direction of the y-axis and $\bar{y}$ is a mean value of the heights in the direction of the y-axis; said method comprising:

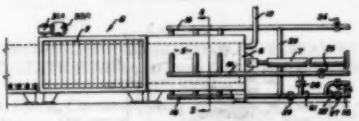
(i) dry-jet wet spinning a spinning solution comprising 24 to 27.5% by weight of an acrylonitrile polymer containing at least 90% by weight of acrylonitrile and an organic solvent of dimethylformamide or dimethylacetamide into a coagulation bath consisting essentially of the said organic solvent and water at 5° C. to 25° C., and

(ii) subjecting the thus spun filaments to simultaneous washing and stretching to 1.05 to 20 times their length in hot water or boiling water of 50° C. to 100° C., applying oiling agents and subsequently dry-heat stretching.

4,695,416
METHOD AND APPARATUS FOR MOULD-FORMING EXPANDED PLASTICS FORM BLOCKS

Peter Treffner, and Charles Treffner, both of 85 Grose Street, Parramatta, New South Wales, 2150, Australia

PCT No. PCT/AU85/00032, § 371 Date Oct. 1, 1985, § 102(e) Date Oct. 1, 1985, PCT Pub. No. WO85/03903, PCT Pub. Date Sep. 12, 1985
PCT Filed Oct. 1, 1985, Ser. No. 784,884
Claims priority, application Australia, Feb. 29, 1984, PG3840
Int. Cl.[4] C08J 9/22
U.S. Cl. 264—45.4 **8 Claims**

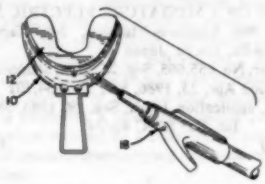


1. In a method of making an expanded plastics foam block section and uniting it with a prior made or partly made section comprising the steps of charging a mould space of which one end is defined by a surface of the prior section with expandable plastics beads, and initiating the expansion and fusion of the beads to create a cohesive but largely unexpanded mass of beads, the improvement comprising obtruding the prior section into the mould space to compress a zone of the cohesive mass adjacent to the said end of the space, increasing the temperature and pressure in the mould space to complete the expansion and fusion process and to compress an end zone of the prior section to bring its end substantially to its unobtruded position, lowering said pressure and temperature, and then ejecting the newly made block section from the mould space.

4,695,417
METHOD OF MAKING AN OPTICALLY CLEAR TOOTH POSITIONING AND RETAINING APPLIANCE

Arthur B. Hall, LaPorte, Ind., assignor to TP Orthodontics, Inc., Westville, Ill.

Filed Nov. 22, 1982, Ser. No. 443,472
Int. Cl.[4] B29C 39/00, 59/08
U.S. Cl. 264—80 **13 Claims**



1. A method of making a substantially optically clear custom tooth positioning and retaining appliance from a resilient thermoplastic material with the capability of having substantially optically clear transparentness, said appliance including air holes extending between the labial and lingual sides thereof and between the archways, wherein the appliance is molded of said material in a flask or mold having mounted therein upper and lower mold members for defining upper and lower archways in the appliance, trimmed on one or more grinding wheels, and optionally buff polished on a buffing wheel, after which the appliance has a semi-opaque or frosty appearance, said method comprising the steps of cooling the appliance to about room temperature or below, mounting an air hole insert in the air holes, and heat polishing the exterior surfaces of the appliance by applying localized heat to said surfaces at a level sufficient to cause momentary surface melting.

4,695,418

METHOD AND APPARATUS FOR MANUFACTURING ROOF TILES AND TILES MADE THEREBY

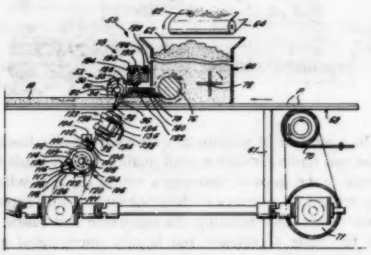
Robin M. Baker, Horsham; Paul R. Sargeant, Wisborough Green; Ernest G. Papper, Crawley; Bhusan K. Oberoi, Horley; Frank A. Smith, Godstone, and Malcolm C. Rae, Reigate, all of United Kingdom, assignors to Redland Roof Tiles Limited, Surrey, United Kingdom

Filed Sep. 12, 1985, Ser. No. 775,413

Claims priority, application United Kingdom, Sep. 12, 1984, 8423048

Int. Cl.[4] B28B *11/12*

U.S. Cl. 264—151 **26 Claims**



1. A method of manufacturing roof tiles comprising the steps of first extruding continuous shaped ribbon of tile forming material onto a succession of moving pallets and subsequently cutting and forming the material into individual green state tiles on pallets with a recess formed in the upper surface of each tile over only part of its length, wherein the method of forming said recess includes the steps of causing a recess cutting tool to engage with the upper surface of the ribbon to penetrate the ribbon downwardly against the direction of movement of the ribbon to cut an inclined portion of the recess, causing said cutting tool to remain at a predetermined depth while moving relative to the ribbon to cut a floor portion of the recess, and moving the cutting tool to a retracted position, and removing the material cut from the recess to a position remote from the tile.

4,695,419

MANUFACTURE OF A MINIATURE ELECTRIC MOTOR

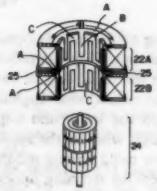
Tokuzo Inariba, 906 Kamiuma-Mansion, 2-9, Kamiuma 4-chome, Setagaya-ku, Tokyo, Japan

Continuation of Ser. No. 655,665, Sep. 28, 1984, abandoned. This application Apr. 23, 1986, Ser. No. 854,701

Claims priority, application Japan, Sep. 28, 1983, 58-177889

Int. Cl.[4] B29C *45/14*

U.S. Cl. 264—259 **10 Claims**



1. A method of manufacturing a composite toothed pole structue in a miniature electric motor, wherein said motor includes an annular fixed coil, a circular permanent magnet, a plurality of pole teeth made of a soft magnetic material, and a yoke of a soft magnetic material in operative contact with said pole teeth and forming a casing and a continuous magnetic circuit through said plurality of pole teeth, said coil magnet, pole teeth and yoke all being co-axial with one another, said magnet having N and S poles alternating circumferentially, and each pole of said magnet corresponding to one of said pole teeth to form a pair of poles, one of each of said pair of poles forming a rotor and the other of each of said pair of poles forming a stator, said method comprising the steps of:

forming said pole teeth and said connecting portion from a single plate of soft magnetic material such that said pole teeth extend axially from said connecting portion;

forming said yoke into a casing from a single plate of soft magnetic material;

positioning said plurality of pole teeth as inserts in an annular mold;

charging said annular mold ith a non-magnetic, synthetic resin to form a bobbin for receiving said core, such that said plurality of pole teeth forming a stator are embedded annularly in said synthetic resin to form a single solid unified structure such that each of said pole teeth has an exposed side facing a corresponding pole of said permanent magnet; and

joining said yoke with said connecting portion to form a continuous magnetic circuit including said yoke and said pole teeth.

6. A method of manufacturing a composite toothed pole structure in a miniature electric motor, wherein said motor includes an annular fixed coil, a circular permanent magnet, a plurality of pole teeth made of a soft magnetic material, and a yoke of a soft magnetic material in operative contact with said pole teeth and forming a casing and a continuous magnetic circuit through said plurality of pole teeth, said coil magnet, pole teeth and yoke all being co-axial with one another, said magnet having N and S poles alternating circumferentially, and each pole of said magnet corresponding to one of said pole teeth to form a pair of poles, one of each of said pair of poles forming a rotor and the other of each of said pair of poles forming the stator, said method comprising the steps of:

forming said pole teeth and said connecting portion from a single plate of soft magnetic material such that said pole teeth extend axially from said connecting portion;

forming said yoke into a casing from a single plate of soft magnetic material;

positioning said plurality of pole teeth as inserts in annular mold;

charging said annular mold with a non-magnetic, synthetic resin to form a cylinder such that said plurality of pole teeth, forming a rotor, are embedded annularly in said synthetic resin to form a single solid unified structure such that each of said pole teeth has an exposed side facing a corresponding pole of said permanent magnet; and

operatively connecting said yoke to said connecting portion.

4,695,420

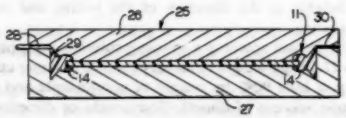
METHOD OF FORMING A WINDOWED UNITARY PANEL

Charles E. Grawey, and Scot L. Winters, both of Peoria, Ill., assignors to Caterpillar Inc., Peoria, Ill.

Continuation of Ser. No. 694,492, Jun. 25, 1984, abandoned. This application Aug. 12, 1985, Ser. No. 764,525

Int. Cl.[4] B29C *61/00*

U.S. Cl. 264—265 **7 Claims**



1. A method of forming a windowed unitary panel having a rigid frame of high modulus plastic material and a transparent windowpane having its peripheral edge integrally embedded within the rigid frame, comprising the steps of:

heating a pane of transparent glazing to a preselected temperature;

positioning the preheated pane within a mold so that the peripheral edge portion protrudes into a mold cavity; and

injecting into the mold cavity the constituent ingredients of the high modulus plastic material causing the plastic material to exothermally rise to a molding temperature for forming the rigid frame and encapsulating the peripheral edge portion within the frame while the pane is in the preheated condition allowing both the pane and plastic material to cool from said temperatures such that the pane and plastic material contract at substantially the same rate to eliminate compressive forces and cause low tensile stresses to be imparted to the pane.

4,695,421

METHOD OF MOLDING A MEMBER HAVING UNDERCUT PORTIONS

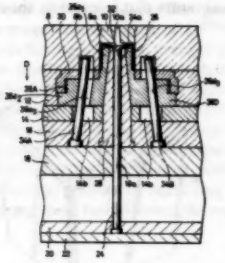
Masami Takeda, Ami, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 5, 1985, Ser. No. 772,712

Claims priority, application Japan, Sep. 19, 1984, 59-196178

Int. Cl.[4] B29C *33/44, 45/44*

U.S. Cl. 264—318 **2 Claims**



1. A method for forming an under-cut portion of a molded article, using a molding apparatus comprising:

a fixed mold plate having a circular hollow portion including an inner peripheral wall defining a cavity for molding the article;

a tapered pin, in the center of which a through-hole is provided, a center pin passing through said through-hole;

a plurality of movable molding plates;

a plurality of core sections supported by said movable molding plates, said core sections forming a core including an outer peripheral surface of cylindrical shape when they are combined; and

a plurality of moving pins, positioned at an inclination angle with respect to a center line of said center pin, and passing through guide holes defined by said movable molding plates and said core sections;

each core section comprising a cylindrical article molding portion projecting into said hollow portion and having an undercut portion, and a holder portion, in which a guide hole for one of said moving pins is provided, the cylindrical article molding portions of said core sections when combined forming said outer peripheral surface of cylindrical shape and having alternating wide outer peripheral arcuate surfaces and narrow outer peripheral arcuate surfaces, said guide holes of said core sections having wide outer peripheral arcuate surfaces being of greater dimension, in a radial direction with respect to an axial line of said center pin, then said guide holes of said core sections having narrow outer periperal arcuate surfaces;

the method comprising the steps of:

(a) injecting the molding material into the cavity defined by the inner peripheral wall of the hollow portion of said fixed molding plate and the combined cylindrical article molding portions to form the molded article including undercut portions;

(b) moving said plurality of moving pins in a direction parallel to the center line of said center pin, so as to cause movement only of said core sections having narrow outer peripheral arcuate surfaces toward the center line of said center pin; and

(c) further moving said plurality of moving pins in a direction parallel to the center line of said center pin, so as to cause movement of said core sections having wide outer peripheral arcuate surfaces toward the center line of said center pin.

4,695,422

PRODUCTION OF FORMED MATERIAL BY SOLID-STATE FORMATION WITH A HIGH-PRESSURE LIQUID STREAM

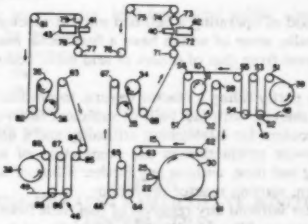
John J. Curro, Cincinnati; Alan J. Trusty, Bethel, and George M. Vernon, West Chester, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 16, 1984, Ser. No. 580,911

The portion of the term of this patent subsequent to Sep. 1, 2003, has been disclaimed.

Int. Cl.[4] B29C *59/06, 69/02*

U.S. Cl. 264—504 **33 Claims**



1. A process for permanently transforming a substantially continuous web of substantially planar, deformable material comprising a film having an indefinite length, a first surface and a second surface into a web of formed material having a substantial third dimensional structure perpendicular to the plane of said material without substantially altering the physical properties or the thermo-mechanical history of said substantially planar web, said material having a transformation temperature range, said process comprising the steps of:

(a) providing said web of material on a forming structure with said first surface of said web of material proximate a forming surface of said forming stucture, said forming surface exhibiting a three-dimensional profile, said forming surface moving in a direction of said length of said web of material and carrying said web of material in said direction;

(b) applying a substantially unconstrained liquid stream which is substantially stationary in the direction of travel of said moving web substantially uniformly to said second surface of said moving web of deformable material in those areas to be transformed, said substantially unconstrained liquid stream having sufficient force and mass flux to cause said moving web of material to be deformed toward said forming surface upon contact therebetween, such that said material acquires a substantial, permanent three-dimensional conformation in the image of said forming surface of said forming structure before passing beyond the influence of said substantially stationary liquid stream; and

(c) controlling the temperature of said web of material such that it remains below said transformation temperature range of said material throughout said process, thereby maintaining said web of substantially planar material in a substantially solid state throughout said process.

4,695,423

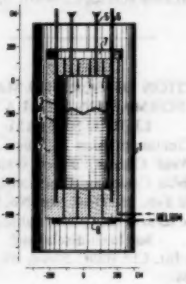
METHOD FOR LOADING, OPERATING, AND UNLOADING A BALL-BED NUCLEAR REACTOR

Eberhardt Teuchert, Jülich; Klaus-Arne Haas, Düren, and Helmut Gerwin, Jülich, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Sep. 18, 1985, Ser. No. 777,353

Int. Cl.[4] G21C *19/00*

U.S. Cl. 376—265 **9 Claims**



1. Method of operating a ball-bed nuclear reactor with fuel element balls, some of which have a fissionable material content different from that of others of said balls, comprising the steps of:

initially partly filling a reactor cavern, to produce a reactor core therein, with fuel balls of sufficient fissionable material content for establishing criticality and a desired level of power production at the completion of said partial filling and then, without any further filling of said reactor cavern, starting reactor operation;

thereafter without any removal of fuel balls from said reactor cavern, filling fuel balls continually or in groups at relatively short intervals into said reactor cavern during increasing burning up of the fuel balls already therein, for compensation of the diminishing fissionable material content of the reactor core constituted by said fuel balls until a final total quantity of filling is reached;

after said final filling quantity is reached and burning up has occurred, shutting down the reactor, cooling it off, releasing the pressure in said cavern, and

thereafter unloading all said fuel balls from said reactor cavern, unloading being begun when the reactor is shut down and being completed before said reactor is restarted.

4,695,424

CELL FOR A SPENT NUCLEAR FUEL RACK

William M. Flynn, Pensacola, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 23, 1985, Ser. No. 790,684

Int. Cl.[4] G21C *19/40*

U.S. Cl. 376—272 **8 Claims**

1. A cell for a spent fuel rack, comprising:

a sheet metal element having an inside surface and an outside surface, and including

a first substantially flat wall portion,

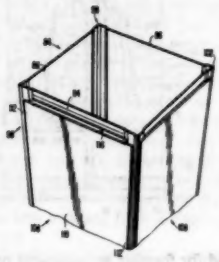
a second substantially flat wall portion disposed substantially perpendicularly to said first wall portion,

a third substantially flat wall portion disposed substantially perpendicularly to said second wall portion and substantially parallel to said first wall portion,

a fourth substantially flat wall portion disposed substantially perpendicularly to said first and third wall portions and substantially parallel to said second wall portion,

an elongated bent region joining said first and second wall portions, said bent region having an elongated and substantially flat platform portion that is disposed substantially parallel to said first wall portion but that is not coplanar with said first wall portion, an elongated and substantially flat platform portion that is disposed substantially parallel to said second wall portion but that is not coplanar with said second wall portion, and at least one protruding portion that is intersected by planes lying on the outer surfaces of said platform portions of said bent region, the outside surface of said at least one protruding portion of said bent region having a radius of curvature that is less than about 0.65 centimeters,

an additional elongated bent region joining said second and third wall portions, said additional bent region having an elongated and substantially flat platform portion that is disposed substantially parallel to said second wall portion but that is not coplanar with said second wall portion, an elongated and substantially flat platform portion that is disposed substantially parallel to said third wall portion but that is not coplanar with said third wall portion, and at least one protruding portion that is intersected by planes lying on the outer surfaces of said platform portions of said additional bent region, the outside surface of said at least one protruding portion of said additional bent region having a radius of curvature that is less than about 0.65 centimeters,



a further elongated bent region joining said third and fourth wall portions, said further elongated bent region having an elongated and substantially flat platform portion that is disposed substantially parallel to said third wall portion but that is not coplanar with said third wall portion, an elongated and substantially flat platform portion that is disposed substantially parallel to said fourth wall portion but that is not coplanar with said fourth wall portion, and at least one protruding portion that is intersected by planes lying on the outer surfaces of said platform portions of said further bent region, the outside surface of said at least one protruding portion of said further bent region having a radius of curvature that is less than about 0.65 centimeters,

another elongated and substantially flat platform portion that is disposed substantially parallel to said fourth wall portion but that is not coplanar with said fourth wall portion, and

another elongated and substantially flat platform portion that is disposed substantially parallel to said first wall portion but that is not coplanar with said first wall portion;

means for joining said another platform portions;

four sheets of neutron poison; and

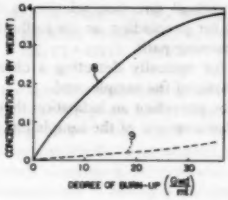
four sheet metal wrappers, each securing a respective neutron poison sheet to a respective wall portion, each wrapper having a substantially flat central portion and substantially flat border regions that lie in the same plane as the central portion and that are attached to platform portions.

4,695,425

FUEL ASSEMBLY

Motoo Aoyama, Hitachi; Hiromi Maruyama, Katsuta; Kikuo Umegaki, Hitachi, and Sadao Uchikawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 3, 1984, Ser. No. 657,082
Claims priority, application Japan, Oct. 4, 1983, 58-185330
Int. Cl.[4] G21C 3/32
U.S. Cl. 376—435 10 Claims



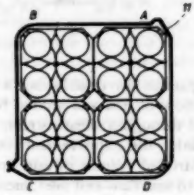
1. A fuel assembly comprising a plurality of fuel rods arranged in a lattice and being charged into a core of a BWR nuclear reactor using light water as a coolant, the fuel rods of the fuel assembly being divided into a first group of fuel rods and a second group of fuel rods, the first group of fuel rods having a first average concentration of U^{236} and the second group of fuel rods having a second average concentration of U^{236} higher than the first average concentration of the first group of fuel rods, the first group of fuel rods and the second group of fuel rods being arranged at different predetermined positions in the fuel assembly, the U^{236} being U^{236} recovered by reprocessing spent fuel, whereby a fuel assembly for a light water BWR nuclear reactor is provided which reduces the requirements for natural uranium by reutilizing uranium recovered by reprocessing spent fuel to lower the reactivity penalty due to U^{236}.

4,695,426

SPACER FOR FUEL RODS

Olov Nylund, Västerås, Sweden, assignor to Aktiebolaget ASEA-ATOM, Västerås, Sweden

Filed Jul. 7, 1986, Ser. No. 882,362
Claims priority, application Sweden, Jul. 9, 1985, 8503403
Int. Cl.[4] G21C 3/34
U.S. Cl. 376—441 10 Claims



1. A spacer for retaining and fixing elongated fuel rods into bundles insertable into a fuel assembly of a nuclear reactor, said spacer being made of a zirconium alloy having a low neutron absorption and comprising spring elements and surrounding structure elements, the spring elements being intentionally given a texture which provides a certain axial irradiation growth and the surrounding structure elements being intentionally given a texture having a smaller axial irradiation growth than that for said spring elements.

4,695,427

METHOD FOR PRODUCTION OF LANTHANIDE-CONTAINING ALLOY

Toru Degawa, Kurashiki; Kozo Fujiwara, Tamano; Akio Hashimoto, Takamatsu; Seiju Uchida, Tamano; Gen Okuyama, Tamano, and Susumu Matsui, Tamano, all of Japan, assignors to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,790
Claims priority, application Japan, Nov. 19, 1985, 60-259385; Jun. 5, 1986, 61-130996
Int. Cl.[4] C22B 34/00; C21B 7/04
U.S. Cl. 420—129 19 Claims

1. A method for the production of a lanthanide-containing alloy, comprising melting under non-oxidizing atmosphere the lanthanide-containing alloy by the use of a container having the inner surface thereof formed of a calcia-based refractory possessing a CaO content of not less than 90% by weight.

4,695,428

SOLDER COMPOSITION

Richard E. Ballentine, Montevallo, Ala., and Robert M. Henson, Cincinnati, Ohio, assignors to J. W. Harris Company, Cincinnati, Ohio

Filed Aug. 21, 1986, Ser. No. 898,498
Int. Cl.[4] C22C 19/00, 18/02
U.S. Cl. 420—561 6 Claims

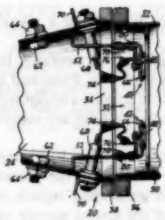
1. A low temperature, lead-free metal solder composition comprising by weight:
0.5–4.0% antimony
0.5–4.0% zinc
0.1–3.0% silver
0.1–2.0% copper
88.0–98.8% tin.

4,695,429

ENGINE EXHAUST PARTICULATE IGNITOR CONSTRUCTION

Peter J. Lupoli, Hamden, and Donald J. Mattis, Norwalk, both of Conn., assignors to Casco Products Corporation, Bridgeport, Conn.

Filed Mar. 20, 1985, Ser. No. 714,190
Int. Cl.[4] B01D 50/00; F01N 3/10, 3/38, 7/18
U.S. Cl. 422—49 22 Claims



9. A vibration-resistant exhaust-gas purification canister for installation in an exhaust line of an internal combustion engine in a vehicle, comprising in combination:
(a) a generally tubular exhaust-gas causing having an open end,
(b) an end fitting having a wide mouth removably connected to the open end of the exhaust-gas casing, and having an inlet port for connection to an exhaust line,
(c) releasable fastening means joining the wide mouth of the fitting to the open end of the exhaust-gas casing, so as to close off said open end,
(d) a porous filter element in the path of the exhaust gas, said filter element trapping particulate matter carried in the exhaust gas,
(e) a vibration-resistant, spiral, tightly wound igniting coil

disposed between the porous filter element in the exhaust-gas casing and the inlet port of the fitting, said coil being located in a path along which the particulate-containing exhaust stream flows, for vaporizing at least some of the particulate matter in the stream whereby the resultant vaporized particulate matter can pass through the porous filter element with minimal clogging of said filter element,

(f) means comprising an enclosing electrically-conducting annular casing, mounting the igniting coil on the end fitting with a face of the coil being exposed to the said exhaust stream so as to increase the efficiency of the vaporizing that occurs, said enclosing casing being connected to an outer convolution of the coil and constituting a terminal thereof, and

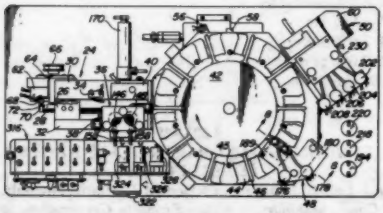
(g) electrical connection means for establishing a circuit from an electrical system of a vehicle to the inner convolution of the igniting coil.

4,695,430

ANALYTICAL APPARATUS

William E. Coville, Levittown, Pa.; Hyman Grossman, Lambertville, N.J., and Michael Sokol, Melrose Park, Pa., assignors to Bio/Data Corporation, Hatboro, Pa.

Filed Oct. 31, 1985, Ser. No. 793,376
Int. Cl.[4] G01N *35/04*
U.S. Cl. 422—65 **16 Claims**



1. Apparatus for automatically performing analytical testing of individual distinct samples of biological fluids wherein one or more test reagents are introducted into said samples and the reacted samples are tested for a change in optical characteristics, comprising:

(a) memory means for storing a plurality of different test protocols,

(b) means for enabling an operator to select one of said plurality of test protocols from said memory,

(c) a plurality of differently-configured sample cell means for receiving individual distinct samples of biological fluid to be tested,

(d) means for receiving individual sample cells

(e) sensor means for sensing the presence of an individual sample cell and generating signals representative of the configuration of the sensed sample cells,

(f) means for transporting individual sample cells to a first location,

(g) means at the first location responsive to the signals representative of the configuration of the sample cells for filtering unwanted non-fluid material from the fluid to be tested and for removing excess fluid to be tested from at least one test chamber in said sample cells to cause a precise, accurate volume of fluid to be tested to remain in the test chamber in response to a first one of said signals and for only removing excess fluid to be tested from at least one test chamber in said sample cells to cause a precise, accurate volume of fluid to be tested to remain in the test chamber in response to a second one of said signals representative of a differently configured sample cell,

(h) means for transporting individual sample cells from the first location to a second location, the means for transporting including means for heating individual sample cells to a preselected temperature,

(i) means at the second location for introducing a first reagent into the sample,

(j) means for transporting individual sample cells from the second location to a test location,

(k) means at the test location for introducing additional reagents into the sample,

(l) means at the test location for optically scanning the sample in a vertical direction relative to individual sample cells and for precluding an air-to-fluid interface in the optical scanning path,

(m) means for optically detecting a change in an optical characteristic of the sample, and

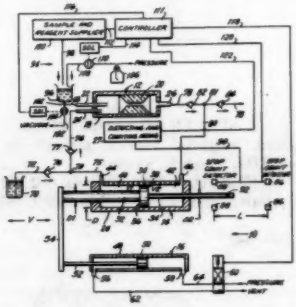
(n) means for providing an indication that a change in said optical characteristic of the sample has been detected.

4,695,431

VOLUMETRIC PUMPING APPARATUS AND METHOD FOR SUPPLYING FLUIDS TO SHEATH STREAM FLOW CELLS

Gregory A. Farrell, Teaneck, N.J., assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Continuation of Ser. No. 408,390, Aug. 16, 1982, abandoned. This application Aug. 16, 1985, Ser. No. 766,671
Int. Cl.[4] G01N *1/14, 21/01*
U.S. Cl. 422—81 **22 Claims**



1. In an apparatus for establishing a precisely controlled sheath stream flow of first and second fluids from respective sources thereof through a sheath stream flow cell having an inlet and an outlet, the improvements comprising, means for pumping a controlled volume of said first fluid from said (a) source thereof to said flow cell inlet, means integral and cooperating with said first fluid pumping means for aspirating a controlled volume of said second fluid from said (a) source thereof to said flow cell inlet, and means integral and cooperating with said first fluid pumping means and second fluid aspirating means for withdrawing by aspiration at a controlled rate from the outlet of said flow cell a volume of mixed first and second fluids equal to the sum of the volumes the first and second fluids introduced into said flow cell while said first and second fluids are being pumped and aspirated, respectively, into said flow cell inlet by said first fluid pumping means and said second fluid aspirating means.

4,695,432

NITRIDES AND OXYNITRIDES WHICH CAN BE USED AS SELECTIVE DETECTORS OF REDUCING GASES IN THE ATMOSPHERE, AND DETECTION DEVICE CONTAINING THEM

Yves Colin, Cesson-Sevigne; Gabriel Rosse, Rennes; Jean Guyader, Agine, and Yves Laurent, Cesson-Sevigne, all of France, assignors to Centre National de la Recherche Scientifique (C.N.R.S.), Paris and Universite de Rennes I, Rennes, both of, France

Filed Mar. 28, 1986, Ser. No. 845,465
Claims priority, application France, Apr. 2, 1985, 85 04989
Int. Cl.[4] G01N *27/12*
U.S. Cl. 422—98 5 Claims

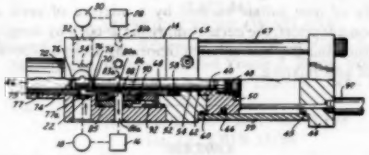
1. A device for the selective detection, in the atmosphere, of nitrogen-containing reducing gases, comprising a support provided with a heating means, said support having a layer thereon of a nitride or oxynitride of tetrahedral structure, and a means for measuring variations in the resistance of said layer in response to chemisorption of nitrogen-containing reducing gases on said layer, said measuring means producing a signal representing the concentration of gases in the vicinity of said layer.

4,695,433

VALVED MIX-HEAD FOR RIM PROCESS

Jerry V. Scrivo, and Gordon W. Breuker, both of Holland, Mich., assignors to Ex-Cell-O Corporation, Troy, Mich.

Filed Dec. 23, 1985, Ser. No. 812,049
Int. Cl.[4] G05D *16/00*; G05B *17/00*; B01F *15/02*
U.S. Cl. 422—112 8 Claims



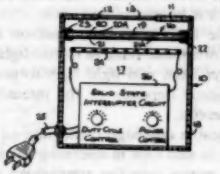
1. A mix-head assembly for combining two or more chemical streams for mixing and discharge into a mold cavity comprising: a mix-head body having a sleeve therein defining a longitudinal mixing bore of constant diameter along the length thereof, said sleeve having a plurality of inlet openings, said mix-head body having a plurality of return ports, each of said inlet openings communicating with said mixing bore to direct a chemical composition stream into said mixing bore, said mixing bore having an outlet end defining a discharge port for flow of a mixture of streams from said mixing bore to a mold cavity, said sleeve having spaced slots in its outer surface in communication with said inlet opening so as to define a return path in said sleeve, a slide plunger of constant diameter along its length in sliding fit relationship with the inside diameter of said bore, a piston valve in surrounding sliding relationship to said plunger and being positioned for opposite reciprocation thereon, said plunger being slidably positioned so as to reciprocate in opposite directions within said bore and being positioned so as to open and close said inlet openings, said piston valve being positioned so as to move in a first direction to cause material to be directed from the mix-head body through said return ports, said piston valve being positioned so as to move in a direction opposite to said first direction to block flow through said return ports so as to cause recirculation flow from each of said inlet openings through one of said slots to one of said return ports.

4,695,434

AROMA-GENERATING UNIT

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Aug. 27, 1982, Ser. No. 412,080
The portion of the term of this patent subsequent to Aug. 24, 1999, has been disclaimed.
Int. Cl.[4] A61L *9/04*
U.S. Cl. 422—116 3 Claims



1. An aroma generating unit comprising:

A. a hollow case whose upper wall has a vent therein and whose side wall has a cartridge-receiving slot;

B. a replaceable cartridge insertable in said slot to occupy a position in said case under said vent; said cartridge, when fully inserted, defining an air-confined chamber within the case, said cartridge having a porous mat having wicking properties impregnated with an aroma-producing liquid enclosed in a housing defined by a pair of sheets between which the mat is sandwiched, said sheets having corresponding central holes therein to form a port which exposes the central portion of the mat, the remaining unexposed portion of the mat acting as a reservoir for the liquid which as liquid is depleted from the central exposed portion, it is replenished by liquid wicked from the unexposed portion; and

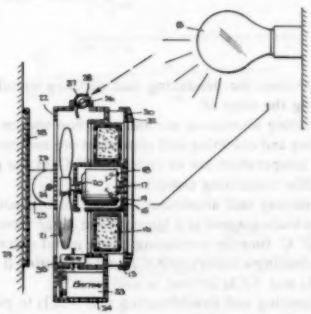
C. an electrical heater disposed in said chamber which, when energized, acts to heat and expand the confined air therein to create a positive pressure forcing the heated air through the port and the exposed portion of the impregnated mat to rapidly volatilize the liquid and to produce an aromatic vapor which is discharged into the atmosphere through said vent.

4,695,435

LIGHT-ACTIVATED AROMA GENERATOR

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Continuation-in-part of Ser. No. 592,915, Mar. 23, 1984, Pat. No. 4,568,521. This application Aug. 13, 1985, Ser. No. 765,152
The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.
Int. Cl.[4] A61L *9/2*
U.S. Cl. 422—124 7 Claims



1. In combination with a switch-controlled light bulb dis-

posed at a fixed position in a room having ambient light therein, an aroma generator which is rendered operative to modify the atmosphere of the room only when the switch connected to said light bulb is turned on; said generator comprising:

A. a case having pressure-sensitive adhesive mounting means for mounting the case on a wall in the room at a position adjacent the light bulb and including a compartment for housing of a battery;

B. a low-voltage direct current motor coupled to a propeller fan and which is housed in said case;

C. an orientable light sensor mounted on said case, said sensor being orientable relative to said light bulb to intercept light rays from said light bulb to produce a signal whose magnitude depends on the intensity of the rays impinging thereon;

D. an air permeable cartridge containing an aroma supply and disposed in said case in operative relation to said fan to exude an aroma into the atmosphere at a relatively rapid rate only when an air current is forced through said cartridge by said fan; and

E. a signal-responsive electronic relay disposed in said case, said relay being coupled to said sensor and connecting said battery to said motor, said relay being actuated only when the signal applied thereto by said sensor has a magnitude which is a function of the light rays from the bulb when it is switched on and substantially exceeds the magnitude of the signal resulting from said ambient light, whereby the operation of the generator is coordinated with that of the light bulb, despite the absence of a wired connection therebetween and the generator is rendered operative only when the switch is turned on.

4,695,436

PROCESS FOR MANUFACTURING HIGH PURITY METAL CHLORIDES

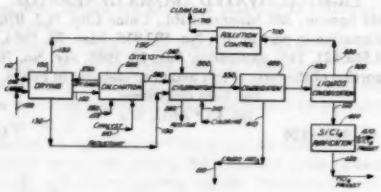
Ronald Wyndham, Thibodaux, La.; Gervaise M. Chaplin, New Delhi, India, and William M. Swanson, Tuscon, Ariz., assignors to Toth Aluminum Corporation, Metairie, La.

Filed Jan. 16, 1985, Ser. No. 691,958

The portion of the term of this patent subsequent to Apr. 30, 2002, has been disclaimed.

Int. Cl.[4] **C01B** *9/02;* **C01F** *7/60, 7/62*

U.S. Cl. 423—135 **9 Claims**



1. A process for producing and yielding metal chlorides, comprising the steps of:

a. providing aluminous ore and a carbon source;

b. drying and calcining said aluminum ore and carbon source at a temperature not to exceed 900° C. in the presence of a sulfur containing compound;

c. combining said aluminous ore and carbon source with a chlorinating agent at a temperature range from 500° C. to 1000° C. thereby producing crude metal chlorides;

d. condensing solid crude $AlCl_3$ and separating it from crude $SiCl_4$ and $TiCl_4$ formed in said step 1c.;

f. sublimating and desublimating said $AlCl_3$ to produce substantially pure $AlCl_3$ at a temperature not to exceed 180° C. and one (1.0) atmosphere of pressure.

4,695,437

SELECTIVE CATALYTIC REDUCTION CATALYSTS

Hyun J. Jung, Wayne, Pa., assignor to Johnson Matthey, Inc., Malvern, Pa.

Filed Jun. 13, 1986, Ser. No. 874,154

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] **B01J** *8/00, 27/053, 27/043;* **C01B** *21/00*

U.S. Cl. 423—239 **3 Claims**

1. In a process for removing NO_x from a gas containing excess oxygen which involves adding NH_3 to the gas and passing the gas over a catalyst at a temperature of 350° to 450° C. to react the NO_x with the NH_3, the improvement which comprises using, as the catalyst, a catalyst consisting essentially of an oxysulfur compound of manganese or nickel, or mixtures thereof, carried by a mixture of ceria and alumina on a support, the ceria comprising 2–60% by weight of the mixture of ceria and alumina and the manganese, nickel or mixture thereof comprises from 0.1–25% by weight of metal based on the carrier weight.

4,695,438

SELECTIVE CATALYTIC REDUCTION CATALYSTS

E. Robert Becker, and Hyun J. Jung, both of Wayne, Pa., assignors to Johnson Matthey, Inc., Malvern, Pa.

Filed Jun. 13, 1986, Ser. No. 874,153

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] **B01J** *8/00, 27/053, 27/043;* **C01B** *21/00*

U.S. Cl. 423—239 **2 Claims**

1. In a process for removing NO_x from a gas containing excess oxygen which involves adding NH_3 to the gas and passing the gas over a catalyst at a temperature of 250° C. to 500° C. to react the NO_x with the NH_3, the improvement which comprises using, as the catalyst, a catalyst consisting essentially of iron sulfate carried by a mixture of ceria and alumina on a support, the ceria comprising 2–60% by weight of said mixture and the iron sulfate comprising from 0.5–50% by weight of said mixture.

4,695,439

YTTRIUM OXIDE STABILIZED ZIRCONIUM OXIDE

Joseph E. Ritsko; David L. Houck, and Howard L. R. Acla, all of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Sep. 25, 1986, Ser. No. 911,603

Int. Cl.[4] **C01F** *17/00*

U.S. Cl. 423—263 **2 Claims**

1. A process comprising:

(a) forming a solution by mixing yttrium hydroxide and a sufficient amount of an aqueous solution of acetic acid to dissolve the yttrium hydroxide, wherein said solution has a concentration of yttrium ion of about 5% to about 20% by weight of said solution,

(b) adding from about 80% to about 95% by weight of zirconium oxide having a particle size range from about 1 to about 5 microns to yield a Zr to Y weight ratio of from about 4:1 to about 19:1 and thereby forming a slurry,

(c) spray drying said slurry to form spherical agglomerates consisting essentially of zirconium oxide and a relatively uniform distribution of yttrium acetate whereby said agglomerates have a size from about 20 to about 200 micrometers,

(d) heating said agglomerates to about 600° C. to about 700° C. in a neutral or oxidizing atmosphere to convert yttrium acetate to yttrium oxide to thereby form zirconium oxide yttrium oxide agglomerates with about 5% to about 20% by weight of yttrium oxide.

4,695,440
CRYSTALLINE ALUMINOSILICATE ISI-6

Nobuyuki Morimoto; Kozo Takatsu, both of Sodegaura, and Michio Sugimoto, Ichihara, all of Japan, assignors to Research Association for Petroleum Alternatives Development, Tokyo, Japan

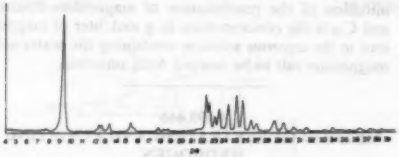
Division of Ser. No. 582,529, Feb. 22, 1984, Pat. No. 4,578,259. This application Jan. 9, 1986, Ser. No. 790,741

Claims priority, application Japan, Mar. 7, 1983, 58-35926; Oct. 14, 1983, 58-190977

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl.[4] C01B *33/28*

U.S. Cl. 423—328 3 Claims



1. A crystalline aluminosilicate which has a composition represented by the general formula (I) after being calcined in the air at 550° C.,

$$pM_{2/n}O.Al_2O_3.qSiO_2 \quad (I)$$

wherein M represents at least one element selected from hydrogen, alkali metals, and alkaline earth metals, n represents the valence of M, and p and q are within the ranges of $0.05 \leqq p \leqq 3.0$ and $60 \leqq q \leqq 500$, and has the X-ray diffraction pattern set forth in Table 2.

4,695,441
MANUFACTURE OF SILANE

Edward J. Lahoda, Edgewood Borough; Herbert A. Burgman, Murrysville, both of Pa., and Young J. Kwon, Fruit Heights, Utah, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 2, 1987, Ser. No. 10,108

Int. Cl.[4] C01B *33/04*

U.S. Cl. 423—347 15 Claims

1. A method of making silane comprising reacting a compound having the general formula SiR_4 with hydrogen, where each R is independently selected from the group consisting of alkoxy to C_4, alkyl to C_4, alkylene to C_4, and alkinyl to C_4.

4,695,442
AMMONIA SYNTHESIS PROCESS

Alwyn Pinto, Middlesbrough, and John B. H. Johnson, Sedgefield, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 20, 1985, Ser. No. 703,531

Claims priority, application United Kingdom, Feb. 3, 1984, 8405591; Apr. 7, 1984, 8417016; Apr. 7, 1984, 8417017; Sep. 10, 1984, 8425508

Int. Cl.[4] C01C *1/04*

U.S. Cl. 423—359 15 Claims

1. A process for the production of ammonia comprising

(i) forming ammonia synthesis gas by

(a) reacting a volatile hydrocarbon feedstock with steam and a gas containing oxygen and nitrogen at a pressure in the range 25 to 50 bar abs. using process conditions and reactant proportions so as to produce a crude gas containing hydrogen,

unreacted steam, and

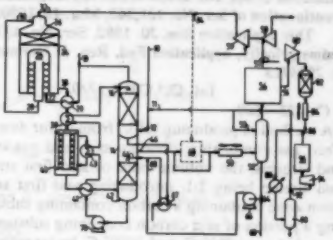
medium boiling gas containing

carbon monoxide, and

nitrogen in an excess of that required in the ammonia synthesis gas,

and in which the molar ratio of hydrogen plus carbon monoxide to nitrogen and other medium boiling gas, if any, is in the range 1.25 to 2.50, and the content of carbon monoxide plus carbon dioxide, if any, is in the range 10 to 25% v/v on a dry basis;

(b) converting carbon monoxide to carbon dioxide by subjecting the crude gas to a single stage of catalytic shift reaction to produce a raw gas having a carbon monoxide content of less than 0.5% v/v on a dry basis and in which at least 90% of the total medium boiling gas is nitrogen, said shift reaction being controlled at 230° to 280° C. and operated in indirect heat exchange with a coolant, thereby producing a stream of heated coolant, and at least some of



the steam employed in the step (a) being introduced by contacting the feedstock with a stream of heated water, comprising hot water or a mixture of hot water and steam, said stream of heated water comprising said heated coolant, where the coolant is water, or being obtained by indirect heat exchange with the stream of heated coolant;

(c) removing carbon dioxide and medium boiling gas, including the excess of nitrogen, from the raw gas by a pressure swing adsorption process, to give a product gas; and

(d) methanating the product gas to convert residual carbon oxides therein to methane; and

(ii) passing the ammonia synthesis gas over an ammonia synthesis catalyst to produce a reacted gas stream containing synthesised ammonia, and separating synthesised ammonia from said reacted gas stream.

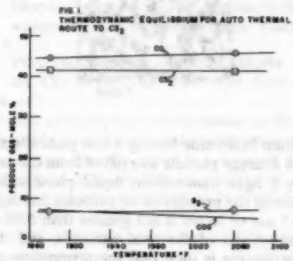
4,695,443
AUTOTHERMAL PROCESS FOR THE PRODUCTION OF CARBON DISULFIDE AND HYDROGEN SULFIDE

Albert M. Leon, Mamaroneck, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Feb. 14, 1985, Ser. No. 701,841

Int. Cl.[4] C01B *31/26, 17/16*

U.S. Cl. 423—443 7 Claims



1. An autothermal process for the production of carbon

disulfide from a carbonaceous material and elemental sulfur which comprises reacting the carbonaceous material with an oxygen-containing gas and elemental sulfur in a one-step process in a fluid bed so as to autogenously generate the temperatures necessary for the reaction of the carbonaceous material with elemental sulfur.

4,695,444

METHOD OF MANUFACTURING SULPHUR FROM SO_2 CONTAINING GASES

Horst Grochowski, Oberhausen; Dieter Zurawsky, Gladbeck; Karl Knoblauch, Essen; Klaus Goldschmidt, Essen, and Jürgen Schwarte, Essen, all of Fed. Rep. of Germany, assignors to Foster Wheeler Energy Corporation, Livingston, N.J.

Continuation of Ser. No. 280,506, Jul. 6, 1981, abandoned, which is a continuation of Ser. No. 131,363, Mar. 18, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 432,398

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1979, 2933713

Int. Cl.⁴ C01B *17/02*

U.S. Cl. 423—569 **9 Claims**

1. A method of producing sulfur from sulfur dioxide containing feed gas comprising: dividing said feed gas into first and second streams, the volume ratio of said first stream to said second stream being 2:1; introducing said first stream into a reaction zone containing a carbon containing substance; maintaining a portion of said carbon containing substance at a temperature between 900° C. and 1000° C. by introducing air into said carbon containing substance at a point upstream of the location at which said feed gas is introduced into said carbon containing substance; contacting said feed gas with said portion of said carbon containing substance for a sufficient time to convert the sulfur dioxide to hydrogen sulfide; combining said hydrogen sulfide with said second gas stream thereby producing a gas mixture containing hydrogen sulfide and sulfur dioxide in a volume ratio of 2:1; causing the hydrogen sulfide and the sulfur dioxide in said gas mixture to react and form sulfur.

4,695,445

MAGNESIUM HYDROXIDE AND PROCESS FOR ITS PRODUCTION

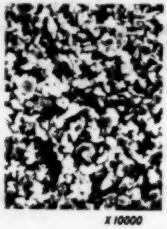
Keiichi Nakaya, Chiba, and Kunio Tanaka, Ichihara, both of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Aug. 11, 1986, Ser. No. 895,464

Claims priority, application Japan, Aug. 14, 1985, 60-177713

Int. Cl.⁴ C01F *5/16*

U.S. Cl. 423—635 **20 Claims**



X 10000

1. Magnesium hydroxide having a fine plate-shaped particle form with an average particle size ($\bar{d}$) of from 0.2 to 0.8 ? m as measured by a light transmission liquid phase sedimentation method, wherein the proportion of particles having a particle size of $\bar{d}+0.5$ μm or larger is not greater than 50% by weight based on the weight of the total particles, and the particle thickness distribution is such that the proportion of particles having a thickness of 0.05 μm or less is not greater than 5% by number and the proportion of particles having a thickness of 0.2 μm or more is not greater than 20% by number; and wherein said magnesium hydroxide is produced by a process which comprises:

(a) reacting an aqueous solution containing a water-soluble magnesium salt, with ammonia; and

(b) precipitating the magnesium hydroxide formed thereby from the aqueous solution, wherein the precipitation of magnesium hydroxide is initiated when the concentration of magnesium hydroxide dissolved in the aqueous solution reaches a level equal to or greater than the value of C_p with C_S being represented by the formula:

$$C_S = 0.0293\ C_M^{1.78}$$

wherein C_S is the concentration in g mol/liter of magnesium hydroxide dissolved in the aqueous solution at the initiation of the precipitation of magnesium hydroxide, and C_M is the concentration in g mol/liter of magnesium ions in the aqueous solution containing the water-soluble magnesium salt to be reacted with ammonia.

4,695,446

METHOD OF SEPARATING AND PURIFYING HYDROGEN

Borislav Bogdanovic, Mulheim an der Ruhr, Fed. Rep. of Germany, assignor to Studiengesellschaft Kohle mbH, Mulheim an der Ruhr, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 626,819, Jul. 2, 1984, which is a continuation of Ser. No. 500,070, Jun. 1, 1983, which is a continuation of Ser. No. 499,140, May 21, 1983, abandoned, which is a continuation of Ser. No. 433,978, Oct. 6, 1982, abandoned, which is a continuation of Ser. No. 187,907, Sep. 17, 1980, abandoned, which is a continuation of Ser. No. 8,739, Feb. 2, 1979, abandoned. This application Jun. 3, 1985, Ser. No. 740,698

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1982, 3247361

Int. Cl.⁴ C01B *1/32*

U.S. Cl. 423—648 R **6 Claims**

1. A method of absorbing hydrogen comprising (a) thermally dehydrogenating magnesium hydride that has been doped with a transition metal by contacting a finely divided form of magnesium hydride with a solution of a transition metal organic compound so that the elementary transition metal precipitates in an extremely finely divided form on the surface of the particles of magnesium hydride, said transition metal being of subgroups IV–VIII of the Period Table, and the removing the solution, thereby yielding active magnesium, and (b) contacting the active magensium with hydrogen, thereby selectively to absorb the hydrogen by forming magnesium hydride, heating the magnesium hydride thereby to desorb the hydrogen in purified form and regenerate active magnesium from the hydride, and recovering the desorbed hydrogen.

3. A method of absorbing hydrogen comprising (a) thermally dehydrogenating a magnesium hydride that has been doped with a transition metal by contacting a finely divided form of metallic magnesium with a solution of a transition metal organic compound, so that the elementary transistion metal precipitates in an extremely finely divided form on the surface of the particles of magnesium, said transition metal being of subgroups IV–VIII of the Periodic Table, thereby yielding active magnesium and (b) contacting the active magnesium with hydrogen, thereby selectively to absorb the hydrogen by forming magnesium hydride, heating the magnesium hydride thereby to desorb the hydrogen in pruified form and regenerate active magnesium from the hydride, and recovering the desorbed hydrogen.

5. A method of absorbing hydrogen comprising contacting the hydrogen with active magnesium wherein the active magnesium initially contacted with the hydrogen is metallic magnesium obtained by thermally dehydrogenating a magensium hydride that has been doped with a transition metal by reacting magnesium with hydrogen in an organic solvent in the presence of anthracene and a halide of a transition metal of the IVth to VIIIth Subgroup of the Periodic Table, thereby selec-

tively to absorb the hydrogen by forming magnesim hydride, heating the magnesium hydride thereby to desorb the hydrogen in purified from and regenerate active magnesium from the hydride, and recovering the desorbed hydrogen.

4,695,447

DESTRUCTION OF INORGANIC HAZARDOUS WASTES

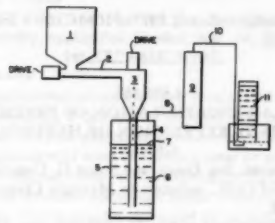
Clifford G. Shultz, Evansville, Ind., assignor to Detox International Corporation, St. Charles, Ill.

Continuation of Ser. No. 628,998, Jul. 9, 1984, abandoned. This application Dec. 17, 1985, Ser. No. 809,976

The portion of the term of this patent subsequent to Nov. 12, 2002, has been disclaimed.

Int. Cl.[4] C02F *11/00, 1/70;* **C22B** *7/00, 5/04*

U.S. Cl. 423—659 **19 Claims**



1. A process for treating non-radioactive hazardous waste comprising residues left in chemical waste dumps or aggregations of hazardous materials collected at chemical waste storage sites, said process comprising the step of contacting said waste with molten aluminum to provide reduction to lower less hazardous oxidation state.

4,695,448

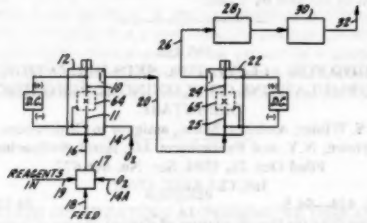
REDUCTION AND DISPOSAL OF TOXIC WASTE

Myron L. Anthony, Grand Junction, Colo., assignor to Grand Junction Reality Co., Inc., Grand Junction, Colo.

Filed Sep. 26, 1985, Ser. No. 780,274

Int. Cl.[4] B01J *19/80;* **F23G** *5/10;* **C01B** *13/11*

U.S. Cl. 423—659 **11 Claims**



1. A method of oxidizing toxic waste compounds entrained as a stream of toxic waste and including the steps of establishing a high temperature electric arc in the gap presented by and between the opposed ends of a pair of spaced elongated consumable electrodes located within a substantially airtight chamber, the temperature within the arc being of an intensity to dissociate the toxic compound, one of the electrodes having a longitudinal bore which opens at its gap end, feeding a mixture of oxygen and the stream of toxic waste to and through said bore so that a jet of oxygen and toxic waste is emitted at said gap where the toxic compound content is dissociated in the presence of oxygen to form gaseous oxides, and establishing via oxygen introduction sufficient pressure within said chamber to force both particulate matter resulting from electrode erosion and evolved oxide gases as a stream of effluent educted from said chamber for disposal.

4,695,449

COMPOSITION AND METHOD FOR TREATMENT OF MELANOMAS

John M. Pawelek, Hamden, Conn., assignor to Yale University, New Haven, Conn.

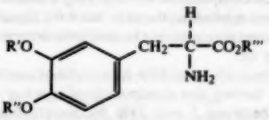
Filed Mar. 30, 1983, Ser. No. 480,402

The portion of the term of this patent subsequent to Apr. 2, 2002, has been disclaimed.

Int. Cl.[4] A61K *49/00, 43/00*

U.S. Cl. 424—1.1 **12 Claims**

1. A composition useful in the treatment of melanomas in human beings comprising at least one O-phosphorylated derivative of DOPA of the general formula I



I

wherein R′ and R″ are each hydrogen or

$$(R''O)_2P(O)-$$

or R′ and R″ together represent

$$(R''O)P(O)$$

wherein R‴ and R⁗ each represent hydrogen or a pharmaceutically acceptable cation and P is ^{32}P with the provisos that R′ and R″ cannot simultaneously be hydrogen.

4,695,450

ANHYDROUS EMULSIONS AND THE USE THEREOF

Kurt H. Bauer, Freiburg-Tiengen, and Heinrich Pins, Eberbach, both of Fed. Rep. of Germany, assignors to Warner Lambert Company, Morris Plains, N.J.

Filed Oct. 7, 1983, Ser. No. 540,082

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1982, 3237814

Int. Cl.[4] A61U *9/26, 31/00, 47/00*

U.S. Cl. 424—22 **6 Claims**

1. An anhydrous physiologically acceptable carrier comprising an emulsion of (1) a hydrophobic liquid selected from the group consisting of a vegetable oil, an animal oil, a mineral oil, a synthetic oil and mixtures thereof and (2) a hydrophilic, anhydrous liquid.

4,695,451

AEROSOL ANTIPERSPIRANT COMPOSITION

Alan Straw, Macclesfield, and Stewart Shields, Salford, both of England, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 30, 1981, Ser. No. 335,991

Int. Cl.[4] A61K *7/32, 7/34, 7/36, 7/38*

U.S. Cl. 424—47 **9 Claims**

1. An aerosol antiperspirant composition in the form of a substantially stable water-in-oil emulsion which does not result in reversion of said emusion when it is sprayed from a container consisting of 25% to 50% by weight of a liquefied, normally gaseous propellant and 50% to 75% of a base consisting essentially of, by weight:

A. 4% to 20% of at least one water-soluble, astringent salt having antiperspirant efficacy;

B. 0.5% to 5% of a water-in-oil emulsifier;

C. 10% to 25% of a propellant-soluble emollient-stabilizer agent consisting of (1) a water-insoluble, organic, liquid

emollient selected from the group consisting of isopropyl esters of C_{12}–C_{18} alkanoic acids, C_8–C_{12} alkanols and silicone oils and (2) a water-insoluble organic liquid hydrocarbon having a boiling point in the range of 65° C. to 130° C., the weight ratio of (1) to (2) being in the range of 0.8:1 to 3:1; and

D. 55% to 78% of water, said base being in the form of a substantially stable water-in-oil emulsion.

4,695,452

COSMETIC STICK

Peter M. Gannis, and Aphrodite Gannis, both of 50 Kensington Rd., Stamford, Conn. 06905

Continuation of Ser. No. 659,257, Oct. 10, 1984, abandoned. This application Aug. 8, 1986, Ser. No. 894,709

Int. Cl.[4] A61K *7/42, 31/355, 31/375*

U.S. Cl. 424—59 **19 Claims**

1. A cosmetic stick composition for applying a cosmetic to human skin, and when applied to the skin has a frictional drag which produces a massaging action, the cosmetic composition consisting essentially of:

approximately between 9.5 and 57% by weight of acetylated monoglyceride having the consistency of a waxy solid; approximately between 5 and 39% by weight beeswax having a melting temperature of approximately 149 degrees F.; and

approximately between 2 and 24% by weight of isopropyl myristate in liquid form, and a cosmetic additive selected from the group consisting of pigments, fragrances, antioxidants, emollients, sunscreens, vitamins, humectants, and moisturizers whereby the cosmetic composition has a coefficient of friction which is greater than approximately 0.5.

4,695,453

THICKENED ALCOHOLIC ANTIMICROBIAL COMPOSITIONS

Francis W. Tuominen, Minneapolis; Helmut K. Maier, Golden Valley, and Warren W. Howland, Champlin, all of Minn., assignors to Henkel Corporation, Ambler, Pa.

Continuation of Ser. No. 694,538, Jan. 24, 1985, abandoned. This application Apr. 30, 1986, Ser. No. 858,099

Int. Cl.[4] A61K *31/78*

U.S. Cl. 424—81 **4 Claims**

1. A method of controlling the growth of bacteria comprising subjecting bacteria to a bactericidally effective amount of an alcoholic antibacterial composition composed of a mixture of about 40–50% ethanol, about 20–30% isopropanol and about 0.5–2% benzyl alcohol thickened with 0.2–2% by weight of a homopolymer selected from the group consisting of

(x) poly(2-acrylamido-2-methylpropane sulfonic acid) and

(y) poly(ammonium 2-acrylamido-2-methylpropane sulfonate) wherein said homopolymer has a molecular weight from about 50,000 to about 5,000,000.

4,695,454

PROCESS FOR PREPARING HEPATITIS B SURFACE ANTIGEN CONTAINING PARTICLES IN NOVEL FORMS WHICH ARE HIGHLY IMMUNOGENIC

Alfred M. Prince, Pound Ridge, and Kwang S. Kim, Staten Island, both of N.Y., assignors to New York Blood Center, Inc., New York, N.Y. and Eugene Tech International, Inc., Allendale, N.J.

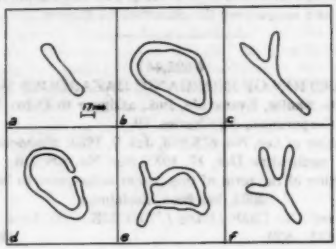
Filed Apr. 1, 1985, Ser. No. 718,248

The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.

Int. Cl.[4] A61K *35/16, 39/29*

U.S. Cl. 424—89 **18 Claims**

1. In a process for heat inactivating a virus in a concentrated mass containing the same and antigenic components thereof, the improvement wherein the concentrated mass is subjected to said heat inactivation without dilution thereof by a proteinaceous material, said heat inactivation comprising subjecting



the mass to a temperature of 101° to 104° C. for a dwell time of 1 to 15 minutes.

4,695,455

CELLULAR ENCAPSULATION OF PESTICIDES PRODUCED BY EXPRESSION OF HETEROLOGOUS GENES

Andrew C. Barnes, San Diego, and Susan G. Cummings, Chula Vista, both of Calif., assignors to Mycogen Corporation, San Diego, Calif.

Continuation-in-part of Ser. No. 693,080, Jan. 22, 1985, abandoned. This application Aug. 30, 1985, Ser. No. 771,313

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] A01N *63/00;* **C12P** *21/00;* **C12N** *15/00, 1/20*

U.S. Cl. 424—93 **19 Claims**

1. A pesticidal composition comprising pesticide-containing substantially intact microbial cells and an inert carrier wherein:

(1) the microbial cells have been stabilized with a chemical reagent selected from the group consisting of halogenating agents, aldehydes, anti-infective, alcohols and histological fixatives under conditions such that the cells have prolonged pesticidal activity when applied to the environment of a target pest; and

(2) the pesticide is a polypeptide, which remains intracellular after stabilisation, and is produced as a result of expression of a heterologous gene in the microbial cell, and which pesticide becomes accessible to a target pest upon ingestion of the cell by a pest.

4,695,456

METHOD FOR ALLEVIATING SKIN IRRITATION BY FORMULATIONS CONTAINING SUPEROXIDE DISMUTASE

Martin S. Wilder, Amherst, Mass., assignor to Centerchem, Inc., Tarrytown, N.Y. and Pentapharm AG, Basel, Switzerland

Filed Oct. 31, 1984, Ser. No. 666,677

Int. Cl.[4] A61K *37/48*

U.S. Cl. 424—94.5 **24 Claims**

1. A method for the alleviation of dermal chemical irritation, dermal chemical inflammation or acne of the skin of a human, comprising applying at an area concentration of at least about 0.002 ml or 2 mg per square cm, a topical formulation containing a non-toxic, non-allergenic carrier and at least about 0.026 weight percent relative to the total weight of the formulation, of purified superoxide dismutase having an activity of at least about 3800 C.I.U./mg or an extract having an equivalent activity thereof, to the skin of said human having chemical irritation, inflammation or acne of the skin.

9. A method for the alleviation of dermal chemical irritation, dermal chemical inflammation or acne of the skin of a human, comprising applying at an area concentration of at least about 0.002 ml or 2 mg per square cm, a topical formulation containing a non-toxic, non-allergenic carrier and an amount of super-

oxide dismutase (SOD) sufficient to deliver at least abvout 1 CIU of SOD per square cm.

4,695,457

ENZYME COMPOSITION ACTING AS A DIGESTION PROMOTER ON VARIOUS LEVELS IN THE ALIMENTARY TRACT, AND A METHOD FOR FACILITATING DIGESTION

Lars G. I. Hellgren, Västra Frölunda, Sweden; Viggo Mohr, Trondheim, Norway, and Jan G. Vincent, Stockholm, Sweden, assignors to Pharmacia AB, Uppsala, Sweden

PCT No. PCT/SE85/00187, § 371 Date Dec. 3, 1985, § 102(e) Date Dec. 3, 1985, PCT Pub. No. WO85/04809, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 24, 1985, Ser. No. 829,642

Claims priority, application Sweden, Apr. 24, 1984, 8402238

Int. Cl.[4] A61K *37/48*

U.S. Cl. 424—94 6 Claims

1. In a pharmaceutical composition formulated as a tablet, a granulated material, a capsule or a pellet and containing an amount of an enzyme preparation which is effective to promote decomposition of food containing meat or adipose tissue, or meat and adipose tissue, the improvement comprising that the enzyme preparation comprises those watersoluble proteolytic enzymes that (i) can be extracted by an aqueous solvent from an aquatic animal selected from the group consisting of the order Euphausiaceae and of the genus Mallotus, and (ii) have molecular weights, in a non-aggregated form, within the range of 15,000–80,000 daltons.

4,695,458

SOLUTION OF ALPHA-CHYMOTRYPSIN

Jorg H. Krumeich, Probst-Hellmich-Promenade 28, 4630 Bochum 6, Fed. Rep. of Germany

Filed Feb. 5, 1986, Ser. No. 826,337

Int. Cl.[4] A61K *37/48*

U.S. Cl. 424—94 6 Claims

1. A method of performing an extracapsular operation for treatment of grey cataract, said method comprising the step of treating the posterior side of the capsule of the lens by irrigation with a composition of matter consisting essentially of alpha-chymotrypsin in a physiologically suitable solvent medium, said alpha-chymotrypsin being present in a dilution of one part by weight of said alpha-chymotrypsin to between 20,000 and 30,000 parts by weight of said solvent medium.

4,695,459

METHOD OF TREATING AUTOIMMUNE DISEASES THAT ARE MEDIATED BY LEU3/CD4 PHENOTYPE T CELLS

Lawrence Steinman; Matthew K. Waldor, both of Palo Alto, Calif.; Subramanian Sriram, Burlington, Vt.; Leonard A. Herzenberg, and Leonore A. Herzenberg, both of Stanford, Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Dec. 26, 1984, Ser. No. 686,126

Int. Cl.[4] A61K *35/56*

U.S. Cl. 424—95 7 Claims

1. A method of treating a patient for an autoimmune disease that is mediated by Leu3(CD4) phenotype T cells comprising parenterally administering a therapeutically effective amount of an anti-Leu3(CD4) antibody that binds to said T cells to the patient.

4,695,460

SYNTHETIC, PLASMA-FREE, TRANSFUSIBLE PLATELET STORAGE MEDIUM

Stein Holme, Virginia Beach, Va., assignor to American Red Cross, Washington, D.C.

Filed Mar. 19, 1986, Ser. No. 841,435

Int. Cl.[4] A61K *35/14*; A01N *1/02*

U.S. Cl. 424—101 20 Claims

1. A sterile, plasma-free platelet storage medium comprising:

a physiologically compatible, aqueous electrolyte solution, one liter of said electrolyte solution having:

between about 3.0 grams and about 7.5 grams of dextrose;

between about 3.0 grams and about 6.0 grams of sodium citrate; and

between about 2.0 grams and about 4.2 grams of sodium bicarbonate;

said platelet storage medium being isotonic and having a pH in a range of between about 6.8 and about 7.4, said platelet storage medium being capable of preserving platelets for at least about 10 days at a temperature of at least about 22° C.

15. A process for preserving platelets in a sterile, plasma-free platelet storage medium comprising:

preparing a physiologically compatible, aqueous electrolyte solution, one liter of said electrolyte solution having:

between about 3.0 grams and about 7.5 grams of dextrose;

between about 3.0 grams and about 6.0 grams of sodium citrate; and

between about 2.0 grams and about 4.2 grams of sodium bicarbonate;

suspending platelets in said platelet storage medium, said platelet storage medium being isotonic and having a pH in a range of between about 6.8 and about 7.4, whereby a substantial concentration of said platelets remain viable for at least about 14 days at a temperature of at least about 22° C.

4,695,461

BONE DISORDER TREATMENT

Sebastian M. Laurent, Greenwell Springs, and Robert N. Sanders, Baton Rouge, both of La., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 741,572, Jun. 5, 1985, abandoned, which is a division of Ser. No. 475,370, Mar. 14, 1983, Pat. No. 4,556,564. This application Nov. 25, 1985, Ser. No. 801,596

Int. Cl.[4] A61K *33/06*, *33/12*

U.S. Cl. 424—154 17 Claims

1. A method of increasing the bone strength of an animal having a bone strength lower than desired, wherein a relatively small effective amount of a zeolite is regularly fed to the animal.

4,695,462

CELLULAR ENCAPSULATION OF BIOLOGICAL PESTICIDES

Andrew C. Barnes, San Diego, and Susan G. Cummings, Chula Vista, both of Calif., assignors to Mycogen Corporation, San Diego, Calif.

Filed Jun. 28, 1985, Ser. No. 750,369

Int. Cl.[4] A01N *65/00*

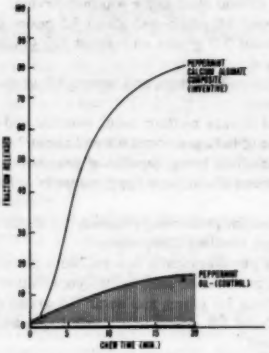
U.S. Cl. 424—195.1 20 Claims

1. An improved pesticidal composition comprising a substantially intact microorganism naturally producing a pesticide, said microorganism stabilized to have prolonged pesticidal activity when applied to the environment of a target pest; and an inert carrier.

4,695,463
DELIVERY SYSTEM FOR ACTIVE INGREDIENTS AND PREPARATION THEREOF

Robert K. Yang, Randolph, and Shri C. Sharma, Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed May 24, 1985, Ser. No. 738,148
Int. Cl.[4] A61K *47/00*; A23G *3/30*; A01N *43/00*
U.S. Cl. 424—440 26 Claims



1. a process of preparing a particulate delivery system comprising:

(i) forming an aqueous suspension of an insolubilized active ingredient and a monovalent cation salt of an algin or carageenen, wherein the insolubilized active ingredient is selected from the group consisting of drugs, favors, coloring agents, sweetening agents, perfumes, bulking agents and mixtures thereof;

(ii) combining the aqueous suspension of the insolubilized active ingredient with a precipitate initiating material to form a polymeric matrix entrapping said active with the matrix interstices;

(iii) rcovering the resultant product and drying to yield the delivery system.

4,695,464
SUSTAINED RELEASE DOSAGE FORM BASED ON HIGHLY PLASTICIZED CELLULOSE ETHER GELS

Daniel A. Alderman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 9, 1984, Ser. No. 658,965
Int. Cl.[4] A61K *9/02, 9/20*
U.S. Cl. 424—449 8 Claims

1. A transdermal pharmaceutical dosage form comprising

(1) a thermoplastic water-soluble gel matrix comprising a water-soluble cellulose ether homogeneously dispersed in an amount of a plasticizer for the cellulose ether sufficient to render the dosage form thermoformable, said gel matrix having dispersed therein a pharmaceutically active agent;

(2) a non-porous covering attached to said gel matrix such that the gel matrix is exposed only on one side, and

(3) a means for adhering the dosage form to human or animal skin such that exposed surface of the gel matrix is in contact with the skin without exposure to the air.

4,695,465
SOFT PATCH

Kazuo Kigasawa; Hideaki Ohtani; Makoto Tanaka, and Shigeru Hayashida, all of Tokyo, Japan, assignors to Takeda Chemical Industry, Ltd., Osaka, Japan

Filed Apr. 5, 1985, Ser. No. 720,401
Claims priority, application Japan, Apr. 5, 1984, 59-66710; Feb. 13, 1985, 60-24393
Int. Cl.[4] A61L *15/03*; A61F *13/00*
U.S. Cl. 424—449 15 Claims

1. In the art of externally applying drug preparations to the skin, which act as a barrier to the absorption of the drug, the improvement which comprises externally contacting the skin with a soft drug preparation containing a percutaneously absorbable drug, applied either topically, directly to the effected site, or in the neighborhood thereof, for the purpose of curing disease on the skin surface, or under the skin, or to systematically reach a target tissue or organ, when absorbed from the skin surface where applied, at a site which is most conductive to the percutaneous absorption of the active components of the drug preparation and where a horny layer is not well developed, said drug preparation exhibiting a stick-itself-to-the-skin property and containing the following components:

(a) a percutaneously absorbable drug;

(b) a water-soluble protein having an absorption promoting effect in an amount which ranges from 5 to 15 weight percent based on the weight of the whole composition;

(c) a polyhydric alcohol in an amount which ranges from 5 to 50 weight percent based on the weight of the whole composition;

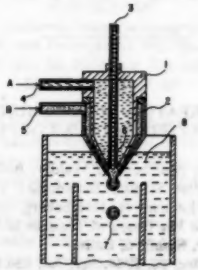
(d) a tackifier in an amount which ranges from 0.1 to 15 weight percent based on the weight of the whole composition; and

(e) an oleaginous substance in an amount which ranges from 0.1 to 25 weight percent based on the weight of the whole composition.

4,695,466
MULTIPLE SOFT CAPSULES AND PRODUCTION THEREOF

Takashi Morishita, Nishinomiya; Takehisa Hata, Muko; Mitio Mori, Higashiosaka, and Shohachi Tanoue, Toyonaka, all of Japan, assignors to Morishita Jintan Co., Ltd. and Fujisawa Pharmaceutical Co., Ltd., both of Osaka, Japan

Continuation of Ser. No. 570,289, Jan. 13, 1984, abandoned. This application Nov. 18, 1986, Ser. No. 931,940
Claims priority, application Japan, Jan. 17, 1983, 58-6287
Int. Cl.[4] A61J *3/07*; A61K *9/54*
U.S. Cl. 424—456 4 Claims



1. A double soft capsule wherein an inner soft capsule containing an oil therein and having a water-soluble film containing gelatin and sorbite thereon is contained with outer capsule oil in an outer soft capsule having a water-soluble film containing gelatin and sorbite thereon, said inner soft capsule having a

diameter of at least 2 mm and said outer soft capsule having a diameter of at least 6 mm.

4,695,467

SUSTAINED RELEASE TABLET

Toshinobu Uemura, Kishiwada; Kiyohide Shinooka, Nishinomiya, and Tokuaki Kajiho, Kobe, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Jul. 5, 1985, Ser. No. 751,866.
Claims priority, application Japan, Jul. 12, 1984, 59-145495
Int. Cl.[4] A61K *9/22, 9/16*
U.S. Cl. 424—502 13 Claims

1. A sustained release tablet which comprises easily disintegrable granules containing

(a) a drug,

(b) a disintegrating agent selected from the group consisting of starch derivatives, gums, cellulose derivatives and ion-exchange resins, and

(c) a water soluble polymer selected from the group consisting of cellulose derivatives, synthetic water soluble polymers and polysaccharides, the surfaces of which granules are treated solely with a wax selected from the group consisting of plant or animal wax, hydrogenated oils and paraffin.

4,695,468

PROCESS FOR PRODUCING CARBONATED BEVERAGES

Ronald P. Boston, Middle Le Havre, Lunenburg County, Canada, assignor to Fronda Limited, Bridgewater, Canada

Filed Oct. 1, 1985, Ser. No. 782,577
Claims priority, application Canada, Oct. 5, 1984, 464891
Int. Cl.[4] A23L *2/26*
U.S. Cl. 426—8 13 Claims

1. A method of producing a carbonated beverage which comprises:

(a) dispensing into a sealable receptacle predetermined amounts of a liquid flavour extract and sugar, an amount of water to provide suitable dilution of said flavour extract, and predetermined amounts of an acidulant and a yeast nutrient buffer to adjust the initial pH level of said diluted flavour extract within said receptacle to less than about 4.0;

(b) thereafter adding to said receptacle an amount of a yeast sufficient to produce said carbonated beverage, said yeast being operational in a pH range falling within an overall range of about 2.5 to about 4 and being operational at and below said initial pH level; and

(c) then mixing the contents of the receptacle and permitting the receptacle to stand to effect fermentation by said yeast with concomitant generation of carbon dioxide, and continuing fermentation with progressive consumption of sugar and nutrient buffer and decrease in pH level until the pH level drops to a value which is not more than about 3.0, and which is below the operational pH range of said yeast, thereby automatically terminating the fermentation process without cooling or heating and resulting in the production of a carbonated beverage in said receptacle.

4,695,469

SHORTENING REPLACING AND FRESH SLICE IMPROVING AGENTS FOR YEAST-RAISED BAKERY PRODUCTS

Curtis J. Forsythe, Raytown, Mo., assignor to Breddo, Inc., Kansas City, Kans.

Continuation of Ser. No. 259,824, May 4, 1981, Pat. No. 4,399,155, which is a continuation-in-part of Ser. No. 962,011, Nov. 20, 1978, abandoned. This application Mar. 17, 1983, Ser. No. 476,059
The portion of the term of this patent subsequent to Aug. 16, 2000, has been disclaimed.
Int. Cl.[4] A21D *2/14*
U.S. Cl. 426—24 5 Claims

1. A method of improving fresh slicing characteristics of yeast-raised bakery products; said products being substantially free of triglyceridal shortening; said method comprising the steps of:

(a) producing a composition comprising succinylated monoglycerides and a lactylic component selected from the group consisting of sodium stearoyl-2-lactylate, calcium stearoyl-2-lactylate, lactylic stearate, and mixtures thereof; wherein

(b) said composition contains an amount of said succinylated monoglycerides in a range of about 5 to about 95 parts by weight and an amount of said lactylic component in a range of about 5 to about 95 parts by weight; and further

(c) after producing said composition incorporating said composition into the ingredients including flour and yeast of said bakery product prior to baking; wherein

(d) said composition is included in said bakery products in an amount within a range from about 0.3% to about 0.5% by weight of said flour; and

(e) baking said ingredients of said bakery products without inclusion of substantial amounts of triglyceridal shortening into said bakery products.

4,695,470

RENNIN-CONTAINING DISRUPTED YEAST CELLS USED IN CHEESE MANUFACTURE

David Botstein, Brookline; Gerald R. Fink, Wellesley, both of Mass., and Ronald W. Davis, Menlo Park, Calif., assignors to Collaborative Research, Inc., Bedford, Mass.

Filed Feb. 28, 1983, Ser. No. 471,360
Int. Cl.[4] A23C *9/12*
U.S. Cl. 426—37 11 Claims

1. A method of clotting milk to form cheese, said method comprising,

providing an active rennin enzyme along with disrupted transformable yeast cells which contain recombinant material from which said rennin has been obtained, in a milk based mixture to clot said milk in the preparation of cheese.

9. A cheese product comprising yeast cellular material from disrupted transformable yeast cells that contain recombinant material that expresses rennin or prorennin and a cheese product.

4,695,471

BREAST CYST FLUID SCREENING METHOD FOR CANCER RISK ASSESSMENT

Martin Fleisher, Glen Cove; H. Leon Bradlow, Holliswood, and Morton K. Schwartz, Tarrytown, all of N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Filed Jul. 30, 1984, Ser. No. 635,846
Int. Cl.[4] G01N *33/48*
U.S. Cl. 436—64 2 Claims

1. A method for screening breast cyst fluid to identify patients having a high risk of developing breast cancer, comprising the steps of measuring the chloride ion content of breast cyst fluid aspirated from the patient; and correlating the chlo-

ride ion concentration with the risk of developing breast cancer wherein said step of correlating comprises classifying a patient having breast cyst fluid with a chloride concentration above about 60 mM/liter as a low risk patient and a patient having breast cyst fluid with a chloride ion concentration of less than 30 mM/liter as a high risk patient.

4,695,472

METHODS AND APPARATUS FOR EXTENDING THE SHELF LIFE OF FLUID FOOD PRODUCTS

Joseph E. Dunn, Rancho LaCosta, and Jay S. Pearlman, San Diego, both of Calif., assignors to Maxwell Laboratories, Inc., San Diego, Calif.

Filed May 31, 1985, Ser. No. 740,004
Int. Cl.[4] A23L *3/32*
U.S. Cl. 426—237 **25 Claims**

1. A method for preserving a fluid foodstuff which is a microbiological nutrient medium comprisng the steps of

providing an edible, pumpable fluid foodstuff which is a microbiological nutrient medium having an indigenous microbiological population, said fluid foodstuff having a viscosity of less than about 1000 centipoise at a temperature about 0° C. and comprising from about 50 to about 95 percent by weight water, and from about 4 to about 50 percent by weight of solids selected from the group consisting of proteins, carbohydrates, fats and mixtures thereof, based on the total weight of the fluid foodstuff,

subjecting the fluid foodstuff to a plurality of substantially uniform high electric field and current pulses through all of the fluid foodstuff, each of said plurality of pulses having a minimum field strength of at least about 5,000 volts per centimeter and a current density of at least about 12 amperes per square centimeter, and each of said plurality of pulses having a duration in the range of rom about 1 to about 100 microseconds and heating said edible pumpable fluid foodstuff to a treatment temperature of at least 45° C. such that all of said fluid foodstuff is subjected to at least one of said high electric field pulses at said treatment temperature of at least about 45° C. to provide a pulsed high electrical field treated fluid foodstuff,

maintaining the pulsed high electric field treated fluid foodstuff under substantially sterile condtions conditions and packaging the pulsed high electric field treated fluid foodstuff to provide a packaged food product having extended shelf-life.

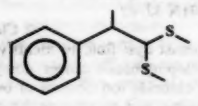
4,695,473

FLAVORING WITH GEM DITHIOETHERS OF PHENYLALKANES

Alan O. Pittet, Atlantic Highlands; Ranya Muralidhara, Fair Haven; Domenick Laccarelli, Jr., Neptune; Kevin P. Miller, Middletown, and Manfred H. Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 747,448, Jun. 21, 1985, Pat. No. 4,585,663. This application Dec. 26, 1985, Ser. No. 813,675
The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.
Int. Cl.[4] A23L *1/226*
U.S. Cl. 426—535 **2 Claims**

1. A process for augmenting or enhancing the aroma or taste of a foodstuff comprising the step of adding to said foodstuff from about 0.05 ppm up to about 250 ppm of the gem dithioether having the structure;



4,695,474

DRY, SUGAR-FREE INSTANT PUDDING MIX

Carol A. Cuneo, South Plainfield, N.J., and Charles Lambert, Decatur, Ill., assignors to General Foods Corporation, White Plains, N.Y.

Filed Oct. 3, 1985, Ser. No. 784,438
Int. Cl.[4] A23L *1/187*
U.S. Cl. 426—579 **6 Claims**

1. A dry, sugar-free instant pudding mix which rapidly and uniformly disperses and hydrates when mixed with cold milk comprising:

(a) at least 45% by weight of pregelatinized corn, waxy maize or tapioca starch material having a particle size distribution wherein at least 55% by weight of the material is retained on a 230 U.S. mesh screen and no more than 2% by weight of the material is retained on an 80 U.S. mesh screen;

(b) from 15 to 30% of an expanded hydrolyzed starch product having a bulk density of less than 0.2 g/cc and a particle size wherein in excess of 80% by weight will be retained on a 270 U.S. mesh screen and

(c) an intensive sweetening agent in an amount effective to impart a sweet taste to the prepared pudding.

4,695,475

IMITATION CHEESE PRODUCTS CONTAINING HIGH AMYLOSE STARCH AS TOTAL CASEINATE REPLACEMENT

Gary A. Zwiercan, Knutsford, England; Norman L. Lacourse, Plainsboro, and Julianne M. Lenchin, Cranbury, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation of Ser. No. 709,946, Mar. 8, 1985, Pat. No. 4,608,265, which is a continuation-in-part of Ser. No. 480,058, Mar. 29, 1983, abandoned. This application Apr. 21, 1986, Ser. No. 854,447
The portion of the term of this patent subsequent to Feb. 12, 2002, has been disclaimed.
Int. Cl.[4] A23C *20/00*
U.S. Cl. 426—582 **8 Claims**

1. An imitation mozzarella cheese product consisting essentially of water, an edible vegetable fat or vegetable oil, cheese additives, and at least one edible caseinate, wherein the improvement comprises the replacement of all of the caseinate by an edible pregelatinized converted or converted and derivatized corn starch having an amylose content of at least about 50% by weight, the converted starch having a calcium chloride water fluidity of about 30–32 and the converted and derivatized starch having a calcium chloride water fluidity of about 30–32 and prepared by treatment of the starch with up to about 0.75% octenylsuccinic anhydride, the cheese containing the starch replacement being functionally equivalent to the cheese containing the caseinate.

4,695,476

PROCESS FOR COATING THE INTERNAL SURFACE OF ZIRCONIUM TUBES WITH NEUTRON ABSORBERS

Alexander L. Feild, Jr., Mt. Lebanon Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 6, 1985, Ser. No. 742,153
Int. Cl.[4] G21C *3/06*
U.S. Cl. 427—6 **25 Claims**

1. A process for forming (a) an integral, adherent boron coating on the internal surface of a hollow tube of a metal, selected from zirconium and a zirconium alloy for use in a nuclear reactor component comprising:

heating the internal surface of the hollow tube to be coated to an elevated temperature of between about 200°–450° C., said internal surface being in an active state; and

passing a mixture of a volatilized boron compound in a carrier gas, selected from the group consisting of helium

and argon, through the heated tube, the volatilized boron compound selected from the group consisting of boron compounds which will decompose at said elevated tem-

perature, whereby the boron compound is heated by said internal surface of the tube, decomposes, and a boron coating is deposited on said internal surface.

4,695,477

METHOD OF PRODUCING A PLANE PHOSPHOR SCREEN

Uwe Viohl, Aichwald, Fed. Rep. of Germany, assignor to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany

Filed Jul. 3, 1985, Ser. No. 752,169

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1984, 3424714

Int. Cl.[4] B05D *5/06*

U.S. Cl. 427—68 **3 Claims**

1. A method of coating a smooth glass faceplate to produce a phosphor screen for use with flat color picture tubes comprising the steps of:

placing a basic mask on the faceplate;

applying a coating mask for a first color;

depositing a first layer of phosphor dispersed in a reactive binder;

causing said first layer to meet with an activator on said faceplate, said activator causing said binder to harden;

applying a coating mask for a second color;

depositing a second layer of phosphor dispersed in a reactive binder;

causing said second layer to meet with said activator on said faceplate;

applying a coating mask for a third color;

depositing a third layer of phosphor dispersed in a reactive binder; and

causing said third layer to meet with said activator on said faceplate;

wherein said activator may either be deposited on said faceplate prior to the deposition of said basic mask, or may be sprayed upon said faceplate with each of said phosphor layers.

4,695,478

GRAY BODY COLORED ZINC SULFIDE ACTIVATED WITH COPPER

Harry O. Schulze, Wyalusing, and Ronald E. Karam, Towanda, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Division of Ser. No. 753,099, Jul. 9, 1985. This application Jun. 6, 1986, Ser. No. 872,579

Int. Cl.[4] B05D *5/06*

U.S. Cl. 427—71 **2 Claims**

1. A process comprising:

(a) forming a first aqueous slurry consisting essentially of a cathodoluminescent copper-activated zinc sulfide phosphor and water,

(b) forming a second aqueous slurry consisting essentially of a mixture of cobalt aluminate, ferric oxide and water, said slurry having a weight ratio of cobalt aluminate to ferric oxide of from about 3.5:1 to about 4.5:1,

(c) combining said first and second slurries to form a third slurry,

(d) adjusting the pH of such slurry from about 5 to about 6,

(e) adding the collodial silica to said third slurry,

(f) adjusting the pH of said third slurry containing said silica to about 8 to about 9 and maintaining said pH for at least about 30 minutes,

(g) removing the resulting pigmented phosphor from the aqueous phase and

(h) drying said pigmented phosphor at about 120° C. to about 160° C.

4,695,479

MOSFET SEMICONDUCTOR DEVICE AND MANUFACTURING METHOD THEREOF

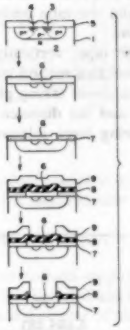
Yukinori Nakakura, and Nobuyuki Kato, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 12, 1986, Ser. No. 838,830

Claims priority, application Japan, Mar. 15, 1985, 60-52608

Int. Cl.[4] H01L *21/314*

U.S. Cl. 437—228 **1 Claim**



1.

A method of forming a MOSFET gate insulating film, comprising the steps of:

forming a SiO_2 film as a gate insulating film on a MOSFET surface by thermal oxidation;

removing the SiO_2 film from the surface area other than the MOSFET region by selective etching and depositing an oxygen doped semi-insulating polycrystalline silicon film; and

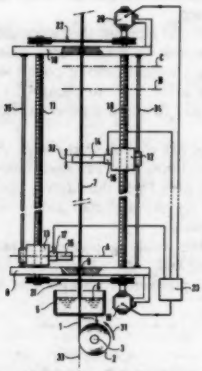
removing the oxygen doped semi-insulating polycrystalline silicon film from the MOSFET region by selective etching and depositing a silicon nitride film and a SiO_2 film formed by CVD method at least on the surface area other than the MOSFET region.

4,695,480

METHOD AND APPARATUS FOR DRAWING A TAPE CONSTITUTED BY A SUPPORT COATED IN A LAYER OF SEMICONDUCTOR MATERIAL, SAID TAPE BEING DRAWN FROM A LIQUID BATH OF SAID MATERIAL

Christian Belouet, Sceaux, France, assignor to Compagnie Generale d'Electricite, Cedex and Societe Nationale Elf Aquitaine, Courbevoie, both of, France

Filed Mar. 25, 1986, Ser. No. 843,546
Claims priority, application France, Mar. 25, 1985, 85 04407
Int. Cl.[4] B05D 5/12
U.S. Cl. 437—225 2 Claims



1. A method of drawing a tape constituted by a support coated with a layer of semiconductor material, said tape being drawn from a liquid bath of said material, the tape being tensed in a vertical plane, said method comprising:

clamping two opposite portions of two respective edges of the tape between the two jaws of a clamp, the clamping being performed at a first level above the bath, in such a manner as to hold the tape coated with said layer in a vertical plane; and

while clamping the tape, vertically displacing the clamp from the first level to a second level higher than the first level, said displacement taking place at a predetermined constant speed, and the distance between said first and second levels being large relative to the length of said portions.

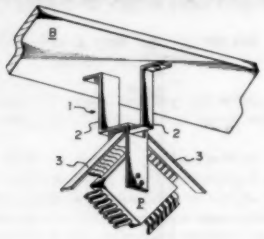
4,695,481

METHOD OF PERFORMING PLATING OF AN ITEM HAVING FINE PARTS AND A SUPPORT DEVICE THEREFOR

Yuuji Kawamata; Tomohiko Iino, both of Souka; Ryoichi Suzuki, Tokyo, and Noriyuki Haga, Saitama, all of Japan, assignors to Senju Metal Industry Co., Ltd., Tokyo, Japan

Filed Mar. 27, 1986, Ser. No. 845,226
Claims priority, application Japan, Mar. 28, 1985, 60-61815
Int. Cl.[4] B05D 5/12
U.S. Cl. 427—96 5 Claims

1. A method of performing plating of an item having a row of fine parts to be plated comprising immersing said item in a bath of molten solder, removing said item from said bath while maintaining said item in an attitude such that said row of fine parts is sloped with respect to the surface of said molten solder, and causing flux to exert a fluxing action on said molten solder which adheres to said fine parts, thereby decreasing the surface



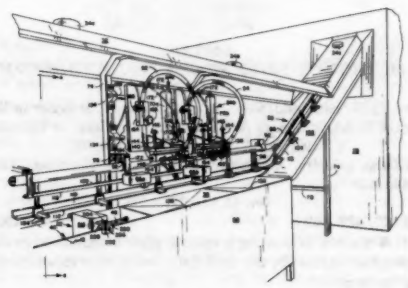
tension of the solder adhering to said fine parts and preventing bridges of solder from forming between said fine parts.

4,695,482

METHOD AND APPARATUS FOR COATING OF CIRCUIT BOARDS

Klaus D. Weiswurm, 818 E. Myrtle St., San Antonio, Tex. 78212

Filed Jan. 21, 1986, Ser. No. 821,404
Int. Cl.[4] B05D 5/12
U.S. Cl. 427—96 21 Claims



1. An apparatus for coating printed circuit boards with insulating material which comprises:

a manifold having an inlet in fluid communication with a source of insulating material and a plurality of outlets;

a length of flexible tubing attached to each of said outlets, said tubing being selectively bendable to direct insulating material to a predetermined location on a printed circuit board;

means for positioning a printed circuit board in a preselected, spaced relationship to said manifold which comprises a conveyer on which the printed circuit board is mounted, means for sensing the spaced relationship between the printed circuit board mounted on said conveyer and said manifold and means for stopping the movement of said conveyer for a predetermined period of time in response to said sensing means; and

means for pumping a measured amount of insulating material through said manifold and out said lengths of flexible tubing onto the printed circuit boards.

4,695,483

METHOD FOR THE PREPARATION OF COMPOSITE MEMBRANES BASED ON INTERPENETRATING POLYMER NETWORKS

Joseph J. Zupancic, Bensenville, and Raymond J. Swedo, Mt. Prospect, both of Ill., assignors to Allied Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 670,187, Nov. 13, 1984, Pat. No. 4,613,440, which is a continuation-in-part of Ser. No. 485,971, Apr. 18, 1983, abandoned. This application Jul. 21, 1986, Ser. No. 887,777

Int. Cl.[4] B05D *5/00*

U.S. Cl. 427—244 **16 Claims**

1. A process for the production of a composite semipermeable interpenetrating polymer network membrane which comprises reacting a polyether with an isocyanate to form an isocyanate-capped polyether, admixing said isocyanate-capped polyether with a heterocyclic nitrogen-containing compound selected from the group consisting of polyvinylpyridine and mixtures of polyvinylpyridine and poly(N-vinylpyrrolidone) to form an interpenetrating polymer network membrane-forming composition, forming a film of said composition on a porous support backing material, curing the resultant composite in a hydrous atmosphere at curing conditions for a time sufficient to generate an amine-capped polymer by hydrolysis of a portion of said isocyanate-capped polyether with said amine-capped polymer subsequently reacting with a portion of the isocyanate groups present in said composition to form a substituted polyurea which serves to physically entwine said heterocyclic nitrogen-containing compound in said composition, and recovering the resultant composite semipermeable interpenetrating polymer membrane.

4,695,484

PROCESS FOR FORMING MOISTURE-PERMEABLE WATERPROOF COATING ON FABRICS

Teruo Tanaka; Teruya Tanaka, both of Ohmihachiman, and Masato Kitamura, Kyoto, all of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Dec. 6, 1985, Ser. No. 805,520

Claims priority, application Japan, Dec. 7, 1984, 59-259743

Int. Cl.[4] B05D *3/02, 3/10, 5/00*

U.S. Cl. 427—245 **20 Claims**

1. A method for forming a moisture-permeable water-proof coating on a fabric which comprises the steps of applying on a fabric a water-based coating composition containing a film-forming polymer which forms a water insoluble polymeric film upon drying or heat treatment and a water-soluble, enzyme degradable polymer, in a proportion of 5 to 70% by weight of the total solid content of said coating composition, drying or heat-treating said fabric to form a film thereon, treating the resulting film on the fabric with an aqueous solution of an enzyme capable of selectively degrading said water-soluble polymer, thereby enzymatically degrading said water-soluble polymer and extracting the degraded water soluble polymer from said film, whereby the film on the fabric is rendered microporous.

4,695,485

FLUID DISPENSING PROCESS

Jame D. M. Gibson, Ilkley, England, assignor to Wool Development International, Ltd., West Yorkshire, England

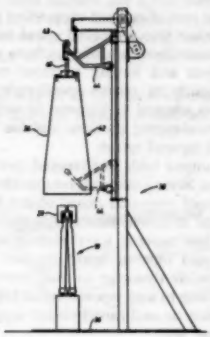
Division of Ser. No. 645,440, Aug. 29, 1984, Pat. No. 4,607,589. This application Mar. 10, 1986, Ser. No. 838,136

Claims priority, application United Kingdom, Sep. 1, 1983, 8323484; Oct. 10, 1983, 8327055

Int. Cl.[4] B05D *5/00*

U.S. Cl. 427—256 **4 Claims**

1. A process for the application of a crease setting composition for trousers having legs with crease lines thereon, comprising supporting said trousers on a conveyor, inserting into the leg of said trousers an apparatus capable of forcing outwardly the trouser leg at said crease and applying crease setting composition within said crease line at or near at least one of the points of said outward force, moving the trousers with respect to the apparatus while said outward force is maintained



so as to deposit the crease setting composition in said crease line, removing said apparatus from said trouser legs, conveying the trousers to a subsequent work station, and repeating the process in a continuous manner.

4,695,486

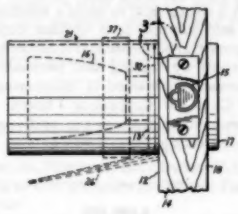
PAINT SHIELDS AND PAINTING METHODS

William C. Stark, 306 S. Almansor St., Alhambra, Calif. 91801

Continuation-in-part of Ser. No. 176,390, Aug. 8, 1980. This application May 16, 1983, Ser. No. 495,300

Int. Cl.[4] B05D *1/32*

U.S. Cl. 427—282 **47 Claims**



1. In a method of applying paint to a surface surrounding a raised circular object, the improvement comprising in combination the steps of:

providing apart from said object a self-supporting paint shield;

winding at least part of said self-supporting paint shield apart from said object into a spiral shield having an inside diameter different from a diameter of said circular object and having portions overlapping each other sufficiently to remain overlapping when said spiral shield is adapted in diameter to said circular object;

leaving said overlapping portions slidable relative to each other in said spiral shield;

shielding said object with the paint shield by fitting said spiral shield having said different inside diameter onto said raised object by changing said spiral shield in inside diameter, with said overlapping portions of said spiral shield sliding relatively to each other until said spiral shield on said raised object is adapted in inside diameter to said raised object and exerts a gripping action supporting the paint shield on said raised object; and

applying paint to said surface exclusive of said shielded object.

13. In a method of applying paint to a surface surrounding a

raised circular object, the improvement comprising in combination the steps of:

providing apart from said object a self-supporting paint shield;

winding at least part of said self-supporting paint shield apart from said object into a tapered spiral having at one end thereof an inside diameter different from a diameter of said circular object and having portions overlapping each other sufficiently to remain overlapping when said tapered spiral is adapted in diameter to said circular object;

leaving said overlapping portions slidable relative to each other in said tapered spiral;

shielding said object with said tapered spiral by fitting said tapered spiral having said different inside diameter at said one end thereof onto said raised object by changing said tapered spiral in inside diameter with said overlapping portions of said tapered spiral sliding relatively to each other until said tapered spiral on said raised object is adapted in inside diameter to said raised object and by applying a force to said tapered spiral for an exertion of a gripping action on said raised object supporting the paint shield thereon; and

applying paint to said surface exclusive of said shielded object.

4,695,487

PROCESS FOR COLORING GRANITE

Cho, Yu H., 1169-23, Choryang-Dong, Dong-Gu, Busan-Shi, Rep. of Korea

Filed Jun. 17, 1986, Ser. No. 875,214

Claims priority, application Rep. of Korea, Apr. 14, 1986, 86-2808

Int. Cl.[4] B05D *3/02*; **C14L** *9/00*

U.S. Cl. 427—294 **5 Claims**

1. A process for coloring a granite which comprises the steps of

dissolving in a solvent a metallic salt formed by reacting a metal with a strong acid to form a solution,

introducing said solution to a vacuum container charged with the granite to permeate said solution into said granite,

developing color by heating said permeated granite in a heating furnace maintained at temperature in the range from 250° C. to 300° C. for 2 or 3 hours,

cooling down to room temperature, and

finally surface-treating the colored granite with a silicone oil.

4,695,488

SOIL RELEASE COMPOSITION AND USE THEREOF

Iwao Hisamoto, Suita; Masaru Hirai, Settsu, and Sueyoshi Ishikawa, Kishiwada, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 3, 1986, Ser. No. 835,754

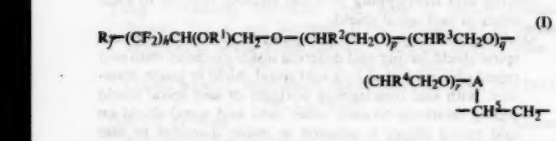
Claims priority, application Japan, Mar. 12, 1985, 60-49944

Int. Cl.[4] B05D *3/02*; **C08L** *75/00*

U.S. Cl. 427—385.5 **17 Claims**

1. A soil release composition comprising:

(A) a polymer containing 10 to 100% by weight of constituting unit of the formula:



(I)

wherein R_f is a C_3–C_{21} fluoroalkyl group; R^1 is a hydrogen atom or a C_2–C_4 acyl group; R^2, R^3, R^4 and R^5 are, the same or different, each a hydrogen atom, a methyl group or an ethyl group; A is a group of the formula: $-CH_2CH(OR^1)CH_2-OCO-$ in which R^1 is the same as defined in the above, $-CO-$, $-(CH_2)_kN(R^2)CO-$ in which R^2 is the same as defined in the above and k is an integer of 1 to 10, or $-(CH_2)_k-$ in which k is the same as defined in the above; h is an integer of 0 to 5; p is an integer of 1 to 40; q and r are, the same or different, each an integer of 0 to 40,

(B) at least one hydrophilic resin selected from the group consisting of glyoxal resin, melamine resin, polyamide resin, urethane resin, acrylic resin and triazine resin, and

(C) a water- and oil-repellent, the weight ratio of (A):(B):(C) being 5–95:95–5:0 or 1–95:5–95:1–50.

4,695,489

ELECTROLESS NICKEL PLATING COMPOSITION AND METHOD

Kenneth P. Zarnoch, Scotia, and Charles D. Iacovangelo, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 28, 1986, Ser. No. 890,050

Int. Cl.[4] C23C *18/34*

U.S. Cl. 427—438 **3 Claims**

1. A method of applying nickel directly to a nonactivated tungsten surface by immersing the tungsten surface in an aqueous electroless nickel plating bath comprising a water-soluble nickel salt; ethylenediaminetetraacetic acid; hydrazine; and monoethanolamine at a temperature of about 70° C. to 100° C. for a period of time sufficient to deposit a layer of nickel on the tungsten surface.

4,695,490

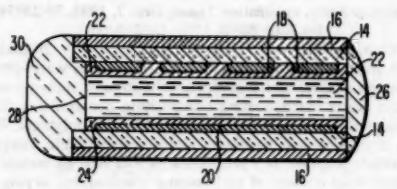
SEAL FOR LIQUID CRYSTAL DISPLAY

Sandra K. McClelland, Bordentown Township, Burlington County; Neal D. Conrad, Ewing Township, Mercer County, and Nitin V. Desai, East Windsor Township, Mercer County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

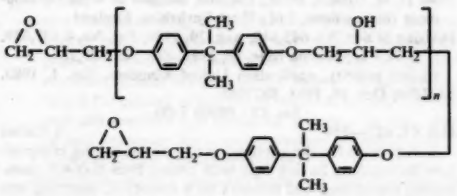
Filed Oct. 15, 1985, Ser. No. 787,679

Int. Cl.[4] B32B *17/10*; **C09K** *19/00*

U.S. Cl. 428—1 **6 Claims**



1. In a liquid crystal display comprising two spaced apart substrates sealed at the periphery with the exception of one or more fill ports, liquid crystal material disposed between the substrates and a sealant for the fill ports, the improvement wherein the sealant comprises a cured epoxy resin of a diglycidylether of bisphenol A precursor represented by the formula



wherein n is 0–2, a curing agent hardener therefor comprising

triethylenetetramine and, optionally, a minor amount of a suitable thixotropic agent.

4,695,491

HEAT-SHRINKABLE COMPOSITE PACKAGING FILM

Kazuo Kondo; Nobuya Ishiguro, and Teruo Tada, all of Marugame, Japan, assignors to Okura Industrial Co., Ltd, Marugame, Japan

Filed May 31, 1985, Ser. No. 739,655
Claims priority, application Japan, Jun. 6, 1984, 59-117354
Int. Cl.[4] B65D *85/00*; B32B *27/00*
U.S. Cl. 428—35 **9 Claims**

1. A heat-shrinkable, composite packaging film comprising:
(a) a core layer of saponified ethylene-vinyl acetate copolymer of 3–20 microns thickness;
(b) a first polymeric outer wall, comprising a first inner layer of a modified polyolefin based resin, directly bonded to said one side of the core layer, and a first outermost layer of a polyamide resin bonded to said inner layer on the side thereof opposite to the core layer, said inner layer and said outermost layer each having a thickness of 5–25 microns; and
(c) a second, heat-sealable polymeric outer wall, bonded to the other side of the core layer, comprising either (i) a single layer of a heat-sealable modified polyolefin based resin or (ii) a laminate comprising a second inner layer of a modified polyolefin based resin bonded to said other side of the core layer and a second outermost layer of a heat-sealable polyolefin based resin, the thickness of said second outer wall being 5–50 microns; said first and second outer wall each having a permeability to hot water having a temperature of 90° C. of less than 600 g/m^2/hour;
said composite film having a total thickness of about 20–120 microns and exhibiting excellent resistance to whitening and delamination when a package sealed in an envelope of the composite film with said first outermost layer being exposed outwardly is sterilized in hot water.

4,695,492

FORMING LUBRICANT FOR A COATED METAL CONTAINER AND METHOD OF MAKING THE SAME

Joseph L. Godar, Wauconda, Ill., assignor to American Can Company, Greenwich, Conn.

Filed Oct. 23, 1985, Ser. No. 790,698
Int. Cl.[4] B27N *5/02*; B21B *45/00*; B21J *13/08*; B65D *90/04*
U.S. Cl. 428—35 **18 Claims**

4. In a coated metal container comprising a seamless side wall and a bottom wall integral with said sidewall, said sidewall being substantially the same thickness as or thinner than said bottom wall and the metal of said walls being selected from the group consisting of electrolytic tinplate and *precoated* tinless low-carbon steel and a hardened coating on the metal surfaces of at least the interior walls of the container, the improvement wherein said hardened coating comprises (1) a coat consisting essentially of a lubricant containing a butyl stearate, liquid lanolin and a silicone resin, said lubricant being compatible with and overcoated with (2) a synthetic resin coating.

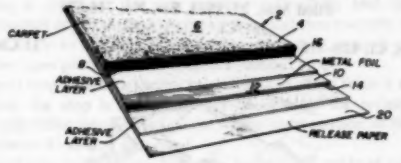
4,695,493

PEEL-AND-STICK CARPET ASSEMBLIES, COMPONENTS THEREOF AND METHODS OF CONSTRUCTION

Randal H. Friedlander; Sheryl A. Nash, and Greg A. Komitor, all of Columbus, Ohio, assignors to Century Adhesives Corp., Columbus, Ohio

Filed Dec. 15, 1986, Ser. No. 941,752
Int. Cl.[4] B32B *33/00*
U.S. Cl. 428—40 **8 Claims**

1. A new peel-and-stick carpet assembly capable of being formed and reformed mechanically or by hand without requiring application of heat thereto into a stable three-dimensional contoured shape that does not exhibit any appreciable shrinkage or stretching and will remain substantially unchanged in any of its three dimensions throughout storage prior to application to a substrate to be covered thereby and during normal life of use thereof after such application which comprises:
a carpet layer having a front surface and a rear surface,
a shape-retention web of thickness between about 1 to 100 mil having a front surface and a rear surface,
a first adhesive layer of thickness between about 1 to 30 mil sandwiched between said carpet layer rear surface and said web front surface adhering said web to said carpet layer,
a second adhesive layer of thickness between about 1 to 20 mil covering said rear surface of said web, and



a release sheet of thickness between about 1 to 10 mil releasably adhered to said second adhesive layer,
said first adhesive layer being formed from a hot melt adhesive composition comprising the following ingredients in the percentages by weight as listed:

styrene-unsaturated hydrocarbon-styrene	
block copolymer	30–50%
tackifying resin	35–50%
reinforcing resin	0–10%
plasticizer	5–20%
degradation inhibitor	0–5%,

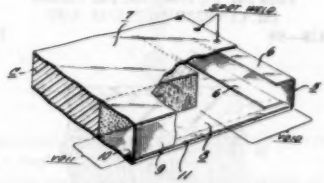
said second adhesive layer being the same as or different from said first adhesive layer formed from hot melt adhesive having said composition, and
said web being a metallic sheet or mesh.

4,695,494

FIRE-RESISTANT ARTICLE AND METHOD OF MANUFACTURE

George F. Fowler, Jr., Norcross, and Charles W. Lehnert, Stone Mountain, both of Ga., assignors to Georgia-Pacific Corporation, Atlanta, Ga.

Filed Nov. 25, 1986, Ser. No. 934,726
Int. Cl.[4] E04B *1/74, 2/28*; B32B *3/26*; B28B *3/00*
U.S. Cl. 428—71 **18 Claims**



9. A light-weight, fire-resistant article comprising a major amount of expanded perlite in compressed form and a minor amount of an adhesive material, the major portion thereof being gelatinized starch, said article having a density of no greater than about 22 lb/cu ft.

15. An article according to claim 9, 10, 11, 12, 13, or 14 in the form of a fire door core.

16. A core according to claim 15 wherein said starch is an ethylated dent, modified corn starch comprising about 25% amylose with about 2.6–2.7% substitution of ethylene oxide.

17. A metal fire door including the core of claim 15.

18. A fire door according to claim 17 comprising metallic

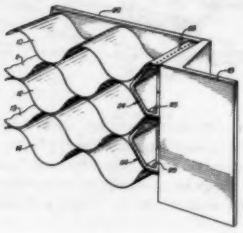
sheets at the side faces of the door, the sheets being interconnected with each other at the edges of the door and being laterally spaced from each other to provide an interior space to accommodate said core, a core in said interior space, and the metallic sheets being adhesively bonded to the side faces of the core.

4,695,495

HONEYCOMB CORE LOAD BEARING STRUCTURE

Robert M. Ault, Westminster, Calif., assignor to TRE Corporation, Los Angeles, Calif.

Filed Mar. 27, 1985, Ser. No. 716,678
Int. Cl.[4] B32B *3/12*
U.S. Cl. 428—73 **11 Claims**



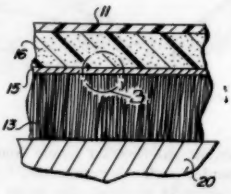
1. A honeycomb core load bearing structure comprising:
a first face member;
a second face member spaced from and parallel to the first face member;
a load bearing edge member attached to an edge of each of said first and second face members;
a plurality of corrugated ribbon core elements disposed between and attached to said first and second face members and forming a honeycomb core, each of said core ribbon elements aligned generally perpendicular to said edge member; and
a plurality of load distributing attachment elements, one each located in the space between adjacent core elements at the edge member and extending between the first and second face members, wherein each attachment element is attached to the adjacent core elements and further attached to said first and second face members.

4,695,496

SKIN PROTECTIVE PAD

William Lee, Star Rte. #1, Box 542, Cave Creek, Ariz. 85331

Filed Jul. 14, 1986, Ser. No. 885,486
Int. Cl.[4] B32B *3/02, 5/18, 5/32*
U.S. Cl. 428—95 **18 Claims**



1. A skin protection pad including in combination:
a first layer comprised of a plurality of hydrophobic fibers for wicking moisture and perspiration away from skin;
a water storage and energy dissipation cushion layer having first and second sides;
a membrane layer interconnecting said first layer and the first side of said cushion layer, said membrane layer having pores through it of sizes constructed to permit passage of water vapor and perspiration from said first layer to said cushion layer and to block passage of water droplets from said cushion layer to said first layer; and
a fourth water impervious layer connected to the second side of said cushion layer.

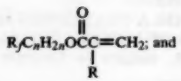
4,695,497

METHOD OF IMPARTING STAIN RESISTANCE TO COLORED SUBSTRATES WHICH INCLUDE A FILAMENTARY MATERIAL

Monte L. Nagy, Jr., Chesterfield, and Charles J. Cole, Chester, both of Va., assignors to Allied Corporation, Morris Township, Morris County, N.J.

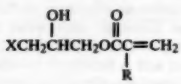
Filed Jan. 2, 1987, Ser. No. 263
Int. Cl.[4] B32B *3/02, 33/00*
U.S. Cl. 428—96 **19 Claims**

1. A method of imparting stain resistance to a colored substrate comprising a filamentary material, said method comprising:
a. applying a first dispersion of a polymer as a finish to a filamentary material during manufacture thereof;
b. forming the filamentary material into a colored substrate; and
c. applying a second dispersion of a polymer to the filamentary material; each of said dispersions being applied in an amount sufficient to achieve at least 300 ppm fluorine from each application on the filamentary material, said first and second dispersions being independently selected from the group consisting of:
i. a first polymer comprising
(a) from about 50 to about 85 parts by weight of units derived from a fluorinated monomer or mixture of fluorinated monomers having the formula

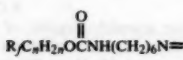


; and

(b) from about 15 to about 50 parts by weight of units derived from one or more monomers having the formula



wherein
R_f is straight or branched-chain perfluoroalkyl containing 4–20 carbon atoms;
R is H or CH_3;
n is an integer from 1–15; and
X is Cl or Br; and
ii. a dispersion comprising
(a) from about 10 to 50 parts by weight said first polymer;
(b) from about 5 to about 10 parts by weight an emulsifier; and
(c) from about 40 to 85 parts by weight a second polymer derived from a monomer having the formula



wherein
R_f is straight or branched-chain perfluoroalkyl containing 4–20 carbon atoms; and n is an integer from 1–15.

4,695,498

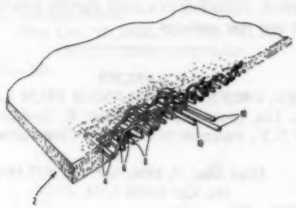
PAPERMAKERS FLAT WOVEN FABRIC

Yvon Sarrazin, Valleyfield, Canada, and Harry D. Smolens, Norristown, Pa., assignors to Asten Group, Inc., Charleston, S.C.

Division of Ser. No. 399,992, Jul. 20, 1982, abandoned. This application Dec. 5, 1984, Ser. No. 678,987

Int. Cl.[4] B32B *3/04*

U.S. Cl. 428—121 **3 Claims**



1. An improved papermakers fabric comprising:
a flat woven fabric having at least one system of continuous machine direction monofilament yarns;
each end of said fabric having a portion of said fabric material folded back upon the adjacent portion of the fabric body thereby defining a hem and hem line;
said hem including an area having loop segments of selected machine direction yarns, extending therefrom;
a first group of machine direction yarn segments distributed in the cross machine direction being drawn against said hem line; and
a second group of machine direction yarn segments interspersed among the yarn segments of the first group extending from said hem line in a defined series of loops such that the loops of the respective ends will intermesh to define a seaming channel which receives a pintle means and the yarns of said first and of said second groups are continuous throughout said fabric hem and body portions.

4,695,499

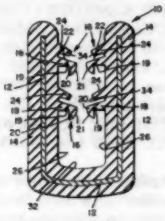
BEADING PROFILE STRIP

Gary Whitener, Paramount, Calif., assignor to Trim-Lok, Inc., Paramount, Calif.

Filed Aug. 29, 1986, Ser. No. 902,221

Int. Cl.[4] B32B *1/04*

U.S. Cl. 428—122 **12 Claims**



1. A beading profile strip comprising:
a. a semi-rigid rectilinear core formed into a U-shaped strip having a channel;
b. a yielding resilient coating disposed about and covering said core forming a coated U-shaped strip having a channel;
c. said coating U-shaped strip comprising a pair of limbs interconnected by an arcuate connecting member and an open portion opposite the arcuate connecting member;
d. at least one leg integrally formed from said resilient coating and projecting from one limb of said coated U-shaped strip inwardly into the channel of the coated U-shaped strip and downwardly at an angle to the limb in a direction extending away from the open portion of the coated U-shaped strip, the leg running continuously throughout the length of said coated U-shaped strip and parallel to the longitudinal axis of said coated U-shaped strip;
e. a foot attached to the leg at the innermost portion of the leg by a joining ankle;
f. at least one stop integrally formed from said resilient coating and projecting from the same limb to which the leg is attached, the stop projecting inwardly into the channel of the coated U-shaped strip and downwardly at an angle to the limb in a direction extending away from the open portion of the coated U-shaped strip;
g. said stop located adjacent to said leg but offset from it so that the stop is always further away from the arcuate connecting portion and closer to the open portion of the coated U-shaped strip; and
h. said stop being shorter than said leg and said ankle of said leg being vertically aligned with the inwardly projecting end of said stop;
i. whereby when a sheet is inserted into the channel through the open portion, the stop does not come in contact with the sheet and does not serve to retard entrance of the sheet and when the sheet is withdrawn from the channel, the stop acts as a fulcrum against which the ankle of the leg must pivot, allowing the foot to rotate upward, be compressed and squeezed between the sheet and stop to thereby provide a resistance force to retard the sheet from being withdrawn from the channel.

4,695,500

STABILIZED FABRIC

John Dyer, Randolph, and John W. Kennette, Somerville, both of N.J., assignors to Johnson & Johnson Products, Inc., New Brunswick, N.J.

Filed Jul. 10, 1986, Ser. No. 884,152

Int. Cl.[4] A61F *13/00*; B32B *3/10*

U.S. Cl. 428—134 **32 Claims**

1. A stabilized fabric comprising a loosely woven component and a staple fiber component,
said woven component comprising a plurality of substantially parallel, spaced apart warp yarns intersecting at right angles with a plurality of substantially parallel spaced apart fill yarns, said warp and fill yarns defining a plurality of openings in said woven component,
said staple fiber component comprising staple length fibers entangled about said warp and fill yarns without completely encasing said woven component, said staple fibers substantially anchoring said warp and fill yarns at the intersections thereof,
said stabilized fabric maintaining a plurality of openings defined by said warp and fill yarns.

4,695,501
THERMOFORMABLE COMPOSITE ARTICLES

Leonard W. Robinson, Trenton, Mich., assignor to Fibre Converters, Inc., Three Rivers, Mich.

Filed Apr. 10, 1984, Ser. No. 598,655
Int. Cl.[4] B32B 5/18, 5/28, 5/32, 7/12
U.S. Cl. 428—159 10 Claims

2. A thermoformable composite article, comprising:

a core layer consisting essentially of a thermoformable synthetic resin foam, said foam consisting essentially of closed cells, said core layer comprising a pair of sub-layers of said synthetic resin foam, which sub-layers are in face-to-face contact with each other but are not substantially bonded to each other in a plurality of spaced-apart areas so that said sub-layers can be separated over said areas during thermoforming to form a plurality of voids in said core layers between said sublayers;

said non-bonded areas being surrounded by continuous adhesively bonded areas so that the non-bonded areas can be shaped into closed chamber surrounded by continuous adhesively bonded areas during subsequent thermoforming;

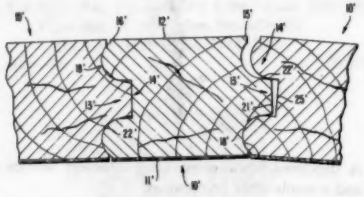
a pair of first and second adhesive layers adhered to the opposite, upper and lower faces of said core layer, respectively; and

a pair of fabric layers superposed on the opposite upper and lower faces of said core layer, which fabric layers are bonded to said faces of said core layer by said adhesive layers, at least one of said fabric layers consisting essentially of a non-woven fabric impregnated with a thermoplastic or an uncrosslinked thermosetting synthetic resin.

4,695,502
INTERLOCKING LANDSCAPE PLANKING

John L. Rush, P.O. Box 548, Lexington, S.C. 29072

Continuation-in-part of Ser. No. 764,476, Aug. 12, 1985, abandoned. This application Jul. 23, 1986, Ser. No. 886,951
Int. Cl.[4] B32B 3/06
U.S. Cl. 428—192 5 Claims



1. Interlocking landscape planking for lawn edging, furniture, retaining walls, area accents and sculpture, wherein each interlocking plank comprises:

front and rear surfaces,

a tongue along one edge of the plank, for attaching said interlocking plank to other like interlocking planks, said tongue having a flat apex which is 11/16 inch in width, the side of which flat apex taper outwardly from said flat apex and continue in a circular arc corresponding to the arc of a circle having a diameter of at least ¾ inch toward the front and rear surfaces, respectively, of said interlocking plank, extending to a point slightly removed from said front and rear surfaces, and

a groove along an edge of the plank opposite the tongue, for attaching said interlocking plank to other like interlocking planks, said groove having a flat base which is ¾ inch in width, the sides of which flat base extend at a 90 degree angle to the plane of said flat base and continue outwardly from said flat base in a circular arc corresponding to the arc of a circle having a diameter of at least ¾ inch toward the front and rear surfaces, respectively, of said interlocking plank, extending to a point slightly removed from said front and rear surfaces.

4,695,503
COATED, ORIENTED, POLYMER FILM LAMINATE

Leland L. Liu, Macedon, and Robert E. Touhsaent, Fairport, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 7, 1986, Ser. No. 837,116
Int. Cl.[4] B32B 3/14, 27/08
U.S. Cl. 428—207 23 Claims

1. A coated, oriented polymer film laminate which comprises:

(a) an oriented core layer having an upper face and lower face, said core layer being fabricated from polypropylene homopolymer;

(b) an oriented, heat sealable layer applied to the lower face, and optionally, to the upper face, of core layer (a), said heat sealable layer being fabricated from a member of the group consisting of heat sealable copolymer or blend of copolymers, heat sealable blend of homopolymers and heat sealable blend of at least one copolymer and at least one homopolymer;

(c) a coating layer applied to the upper face of core layer (a), or, where heat sealable layer (b) has been applied thereto, to the exposed surface of said layer (b), said coating layer being derived from an interpolymer which is obtained from the interpolymerization of from about 0 to 15 parts by weight of an alpha-beta monoethylenically unsaturated carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid and mixtures thereof with from about 85 to about 100 parts by weight of neutral monomer esters; and,

(d) an adhesively bonded substrate or a water-based coating composition applied directly to the exposed, untreated surface of heat sealable layer (b) applied to the lower face of core layer (a).

4,695,504
THICK FILM RESISTOR COMPOSITION

Hirotoshi Watanabe, Kadoma; Osamu Makino, and Toru Ishida, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 18, 1986, Ser. No. 875,872
Claims priority, application Japan, Jun. 21, 1985, 60-136411; Oct. 4, 1985, 60-222231; Mar. 10, 1986, 61-51705
Int. Cl.[4] B32B 3/00; H01B 1/06
U.S. Cl. 428—209 20 Claims

1. A thick film resistor composition comprising a silicide powder and an alkaline earth borosilicate glass powder dispersed in a vehicle containing an acrylic polymer, said silicide powder being composed of 0–40 mol % of molybdenum disilicide and a 100–60 mol % of a mixture of a tantalum disilicide and a magnesium silicide, the mol ratio of said tantalum disilicide to said magnesium silicide ranging from 9.5:0.5 to 5:5, said alkaline earth borosilicate glass powder containing 8–10 wt % of niobium pentoxide.

9. A thick film resistor composition comprising a silicide powder and an alkaline earth borosilicate glass powder being dispersed in a vehicle containing a acrylic polymer, said silicide powder being composed of 10–90 mol % of cobalt silicide and 90–10 mol % of nickel disilicide, said alkaline earth boro-

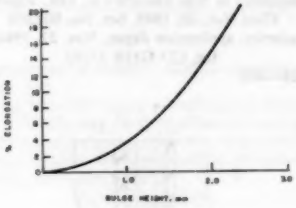
silicate glass powder containing 8–10 wt % of niobium pentoxide.

4,695,505

DUCTILE ELECTROLESS COPPER

Oleh B. Dutkewych, Harvard, Mass., assignor to Shipley Company Inc., Newton, Mass.

Filed Oct. 25, 1985, Ser. No. 791,597
Int. Cl.[4] B05D *1/00, 3/06*
U.S. Cl. 428—209 14 Claims



1. An electroless deposit of copper containing a minor amount of codeposited nickel and having an elongation capability of at least 10 percent wherein, said deposit is made by deposition from an electroless copper plating solution capable of depositing electroless copper having an elongation capability of at least 10 percent, said solution being characterized by the presence of nickel ions, a member selected from the group of cyanide ions, ferrocyanide ions and mixtures thereof, a source of formaldehyde, hydroxyl radicals, Quadrol, and by the absence of substances in concentrations that would reduce elongation below about 10 percent.

4,695,506

RIGID AND SEMIRIGID THERMOPLASTIC STRUCTURES WITH MULTIPLE COEXTRUDED POLYMERIC LAYERS INCORPORATING AN INNER VINYLIDENE CHLORIDE COPOLYMER LAYER AND USE OF THESE STRUCTURES FOR THE MANUFACTURE OF PACKAGES

Claude Dehennau, Waterloo, and Yannick Vandendael, Braine-l'Alleud, both of Belgium, assignors to Solvay & Cie. (Societe Anonyme), Brussels, Belgium

Filed Jul. 17, 1985, Ser. No. 755,904
Claims priority, application France, Jul. 19, 1984, 84 11630
Int. Cl.[4] B32B *7/02*
U.S. Cl. 428—212 9 Claims

1. A rigid or semirigid thermoplastic structure comprising multiple coextruded polymeric layers,

an inner vinylidene chloride copolymer layer,

vinyl chloride polymer layers having a gel temperature not exceeding about 190° C. and a dynamic viscosity at 180° C. and 1 sec^{-1} not exceeding about 2 10^5 Pa s, and

separate adhesive layers of vinyl chloride polymer,

wherein each face of said inner vinylidene chloride copolymer layer is bonded to one said vinyl chloride polymer layer by means of one adhesive layer and the vinyl chloride polymer of said one adhesive layer has a gel temperature and a dynamic viscosity at 180° C. and 1 sec^{-1} lower than the gel temperature and the dynamic viscosity of the vinyl chloride polymer of its adjacent layer under the same conditions.

4,695,507

LOW TOXIC CEILING BOARD FACING

William C. Schwartz, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. No. 731,075, May 6, 1985, abandoned. This application Sep. 10, 1985, Ser. No. 774,524
Int. Cl.[4] B32B *17/02;* B05D *3/02*
U.S. Cl. 428—228 13 Claims

1. A process for manufacturing a coated, sculptured, nubby fabric useful as a ceiling board facing comprising:

(1) applying, to at least one face of a nubby, textured fabric substrate made of a plurality of yarns, a uniform layer of a thick, flame-retardant coating containing a pigment, a flame-retardant and a resin, the coating contacting and encapsulating substantially all of the yarns of the substrate with a tough, adherent film, the coating composition when exposed to heat or flame emitting vapors of low-toxicity and low smoke, and

(2) drying the thus-coated substrate to produce a sculptured, nubby, textured fabric having a non-cellular coating thereon.

4,695,508

ADHESIVE COMPOSITION

Kunio Kageyama, Yokohama, and Sumio Takasugi, Hiratsuka, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 773,278
Int. Cl.[4] C09J *7/02;* H01B *1/22, 1/26*
U.S. Cl. 428—261 3 Claims

1. A structural adhesive which is obtained by impregnating, spread-coating or laminating a strand, surface mat, cloth, woven fabric or victoria lawn, composed of glass fiber, a glass fiber/organic fiber composite, an organic fiber or a carbon fiber, with an adhesive composition comprising (1) at least one polymer having polar groups, which is selected from the group consisting of acrylonitrile/butadiene copolymers, carboxyl group-containing acrylonitrile/butadiene copolymers, acrylic rubbers, urethane rubbers, chloroprene rubber, chlorosulfonated polyethylene, ethylene/vinyl acetate copolymers, ethylene/acrylic acid copolymers, thermoplastic polyurethanes, saturated polyesters and polyamides, (2) at least one epoxy acrylate resin, (3) at least one acrylic or methacrylic monomer selected from the group consisting of acrylic or methacrylic monomers having at least two different functional groups in the molecule, and acrylic or methacrylic monomers represented by the following general formula:

$$H_2C=C(R_1)-COOR_2$$

wherein R_1 is a hydrogen atom or a methyl group, and R_2 is an alkyl group having 1 to 18 carbon atoms or an organic residue containing an aromatic hydrocarbon ring or a heterocyclic ring, (4) an organic peroxide, (5) an imidazole or an amino compound containing at least one tertiary amino group, and (7)

at least one electrically conductive material selected from the group consisting of carbon black having a surface area of 125 to 260 m^2/g as determined by the N_2 adsorption method and a DBP oil absorption of 100 to 200 cc/100 g, ketjenblack, lamp black, acetylene black and graphite, and a cut carbon fiber and fine powders of aluminum, nickel, copper and zinc having a size not larger than 200 mesh.

4,695,509

POLYAMIDE FIBER REINFORCEMENT IN THERMOSET POLYURETHANE COMPOSITES

Colleen W. Cordova, Midlothian, Va., and Hugh H. Rowan, Chapel Hill, N.C., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 23, 1985, Ser. No. 812,581
Int. Cl.[4] B32B *27/40*
U.S. Cl. 428—267 **8 Claims**

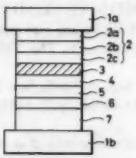
1. A fiber-reinforced thermoset polyurethane molded composite characterized by improved impact strength comprising molded thermoset polyurethane matrix reinforced with high tenacity polyamide fiber in an amount sufficient to provide said composite with said improved impact strength, said polyamide fiber characterized by a drawn denier of 4 to 8 denier per filament; a thermal shrinkage of up to about 14 percent; an elongation of less than 28 percent; and a tenacity of at least 5.5 grams per denier.

4,695,510

OPTO-MAGNETIC RECORDING MEDIUM

Mitsuharu Sawamura; Kazuoki Honguu, both of Yokohama, and Kazuhiko Kikuchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1985, Ser. No. 767,867
Claims priority, application Japan, Aug. 28, 1984, 59-177582
Int. Cl.[4] G11B *7/24*
U.S. Cl. 428—336 **9 Claims**



1. An opto-magnetic recording medium comprising:
a plastic substrate at least substantially transparent to light;
a recording layer consisting of an amorphous magnetic material;
an under-coated layer comprising a silicon oxide film, a metal film at least substantially transparent to light and a nitride film laminated in succession from the substrate side between said substrate and said recording layer; and
a protective overcoat formed on the side of said recording layer opposite the side on which said under-coated layer is formed.

4,695,511

GRANULE FOR SEPARATING ORGANIC COMPOUNDS FROM AQUEOUS LIQUIDS

Howard Goodman, and Andrew R. Fugler, both of St. Austell, England, assignors to English Clays Lovering Pochin & Company, Cornwall, England

Filed Nov. 27, 1984, Ser. No. 675,960
Claims priority, application United Kingdom, Dec. 1, 1983, 8332174
Int. Cl.[4] B32B *5/16*; C09C *1/42*; C02F *1/42*
U.S. Cl. 428—404 **11 Claims**

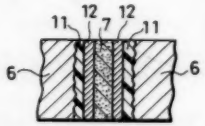
1. A granule useful for separating organic substances from an aqueous medium comprising an inner core, which is formed from a material that does not expand in the presence of organic compounds, and is selected from the group consisting of carbonaceous, siliceous and alumino-siliceous materials, and an outer shell formed from an organophilic cation-modified clay.

4,695,512

MAGNETIC HEAD FOR PERPENDICULAR MAGNETIC RECORDING

Takashi Hatanai, and Keishi Nakashima, both of Nagaoka, Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Nov. 20, 1985, Ser. No. 800,056
Claims priority, application Japan, Nov. 22, 1984, 59-246162
Int. Cl.[4] G11B *5/235*
U.S. Cl. 428—408 **5 Claims**



1. A magnetic head for perpendicular magnetic recording comprising:
a pair of substrates constituted by a non-magnetic material and having their opposing surfaces respectively formed with heat-resistant polymer films for reduced surface roughness of $R_{max}=0.05$ microns;
a thin magnetic film retained between said substrates; and
a non-magnetic intermediate film interposed between said thin magnetic film and each of said heat-resistant polymer films and having a coefficeint of thermal expansion which is close to that of said thin magnetic film.

4,695,513

MAGNETIC RECORDING MEDIUM

Minoru Hashimoto, Kawasaki; Hajime Takeuchi, and Takeo Itoh, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Continuation of Ser. No. 647,385, Sep. 5, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 929,364
Claims priority, application Japan, Sep. 6, 1983, 58-162578
Int. Cl.[4] G11B *5/702*
U.S. Cl. 428—425.9 **10 Claims**

1. A magnetic recording medium, comprising a hexagonal system ferrite magnetic powder uniformly dispersed in a curable binder resin material comprising at least one of a vinyl chloride-vinyl acetate series resin and a polyurethane series resin, said binder having a B value in a following apparent viscosity equation:

$$\log \eta a = Bx + \log [\eta]$$

wherein ηa is an apparent viscosity in cP at a temperature of 25° C., x is a resin concentration in weight percent, is a limiting viscosity in cP at a temperature of 25° C., and B is a constant, said B value being 10 or less and measured by dissolving said binder resin material in a mixed solvent of equal weights of methyl ethyl ketone, toluene and cyclohexanone.

4,695,514

MAGNETO-OPTICAL MEMORY ELEMENT

Akira Takahashi, Nara; Yoshiteru Murakami; Junji Hirokane, both of Tenri; Hiroyuki Katayama, Nara, and Kenji Ohta, Yao, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 28, 1984, Ser. No. 675,850
Claims priority, application Japan, Nov. 29, 1983, 58-227293
Int. Cl.[4] G11B 7/24
U.S. Cl. 428—432 16 Claims

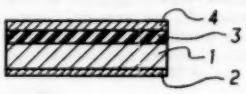
1. A magneto-optical memory element comprising:
a substrate; and
a recording thin-film having a longitudinal surface formed on said substrate, said recording thin-film having an axis of easy magnetization prependicular to said surface, and said recording thin-film being made of an amorphous Nd-Gd-Fe ternary alloy thin-film.

4,695,515

METAL CORED BOARD AND METHOD FOR MANUFACTURING SAME

Hideaki Shirai; Kimio Chiba; Koji Okawa; Hiroshi Ishibashi; Akihiro Ishii; Hirotaka Itoh; Hirokazu Kuzushita; Michihiko Yoshioka, and Michio Hirose, all of Amagasaki, Japan, assignors to Dainichi-Nippon Cables, Ltd., Hyogo, Japan

Filed Jul. 26, 1985, Ser. No. 759,210
Claims priority, application Japan, Jul. 30, 1984, 59-118195[U]; Jul. 30, 1984, 59-118196[U]; Dec. 22, 1984, 59-271425; Dec. 22, 1984, 59-271426
Int. Cl.[4] B32B 15/08
U.S. Cl. 428—458 6 Claims



1. A metal cored board which comprises a base metal core, an easily solderable metal plating layer formed on one surface of the base metal core, an electrically insulating layer formed on the other surface of the base metal core, and an electrically conductive metal layer formed on the electrically insulating layer.

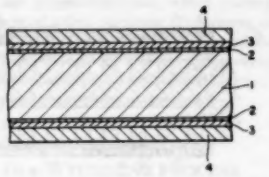
4,695,516

HEAT RESISTANT PRECOATED STEEL SHEET AND PROCESS FOR THE PRODUCTION THEREOF

Kenichi Masuhara; Kazuo Yamayoshi, and Kouji Wakabayashi, all of Chiba, Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Filed Feb. 3, 1986, Ser. No. 825,263
Claims priority, application Japan, Feb. 2, 1985, 60-18985
Int. Cl.[4] B05D 7/04, 7/16
U.S. Cl. 428—623 12 Claims

4. A precoated steel sheet suitable for use in the manufacture of a muffler of an automobile exhaust gas system comprising:
a hot dip aluminized steel sheet,
a chromate pretreatment layer formed on each surface of said a hot dip aluminized steel sheet and having a chromium pick-up of 10 to 50 mg/m^2,
a primer coat formed on said pretreatment layer and comprising a cured polyamide imide resin and 8 to 52 parts by weight, based on 100 parts by weight of said resin, of strontium chromate intimately admixed with said resin,
a top coat formed on one of the primer coats and comprising a cured polyamide imide resin and 8 to 32 parts by weight, based on 100 parts by weight of said resin, of aluminum scale intimately admixed with said resin, and



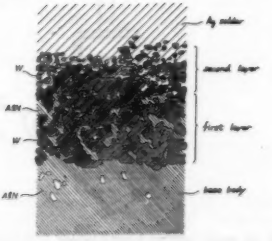
a black top coat on the other primer coat and comprising a cured polyamide imide resin having intimately admixed therewith 1.5 to 5 parts by weight of aluminum scale, 30 to 40 parts by weight of a calcined black pigment and 4 to 6 parts by weight of silica powder, based on 100 parts by weight of said resin.

4,695,517

COMPOSITE LAYER ALUMINUM NITRIDE BASE SINTERED BODY

Akiyasu Okuno, Kani; Masakazu Watanabe, Nagoya, and Kazuhiko Ikoma, Komaki, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Jun. 2, 1986, Ser. No. 869,792
Claims priority, application Japan, May 31, 1985, 60-119174; Jun. 13, 1985, 60-129023; Jun. 17, 1985, 60-131570
Int. Cl.[4] C04B 35/58; F27D 7/06
U.S. Cl. 428—698 6 Claims



1. A composite layer aluminum nitride-base sintered body which comprises:
on at least one surface of AlN-base sintered body a first layer and a second layer in the recited order,
said first layer consisting essentially of
100 parts by weight of at least one first component selected from the group consisting of W, Mo, borides thereof and carbides thereof, and
0.1–50 parts by weight of a second component consisting essentially of AlN, and
said second layer consisting essentially of
at least one component selected from the group consisting of W, Mo, borides thereof and carbides thereof.

4,695,518

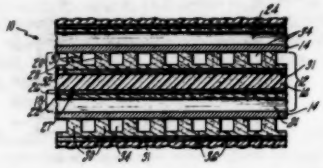
SILICON CARBIDE MATRIX FOR FUEL CELLS

John C. Trocciola, Glastonbury; Joseph Powers, Riverside, both of Conn., and Ronald G. Martin, Monson, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 516,152, Jul. 21, 1983, abandoned. This application Apr. 10, 1985, Ser. No. 722,176

Int. Cl.[4] H01M 8/14

U.S. Cl. 429—12 8 Claims



1. A fuel cell comprising:

a pair of spaced apart gas diffusion electrodes;

a porous electrolyte retaining matrix confined in the space between said electrodes, said matrix having a porosity of at least 38 percent and consisting essentially of 70 to 90 weight percent silicon carbide and a balance of hydrophilic polyethersulfone as a binder; and

phosphoric acid electolyte disposesd within said matrix, wherein said matrix has the characteristic that it remains physically intact for at least 17,000 hours of fuel cell operation at 375° F.

4,695,519

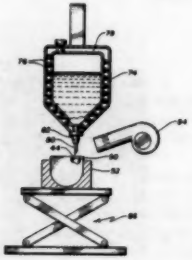
ELECTROCHEMICAL CELL CONSTRUCTION AND FILL METHOD

T. V. Rao, Coon Rapids, and Robert C. Samec, St. Paul, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Continuation of Ser. No. 264,789, May 18, 1981, abandoned. This application Jun. 23, 1983, Ser. No. 507,044

Int. Cl.[4] H07M 10/44; B65B 1/20

U.S. Cl. 429—52 5 Claims



1. The method of introducing a fluid component into an electrochemical cell having a filler opening in the cell container plugged with a penetrable self-sealing septum, and in which the fluid component is of the type which is solid at ambient temperature and which must be heated to a melting point to achieve the fluid condition, comprising:

penetrating the septum with a hypodermic-like needle,

introducing the heated fluid component into the container by flow through the needle,

heating the needle to prevent uncontrolled solidification of the fluid component therein and flow stoppage, and

cooling the needle to stop fluid flow therethrough by solidification of the fluid component as desired.

4,695,520

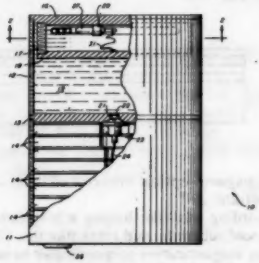
ELECTROCHEMICAL RESERVE BATTERY

Kenneth T. Koper, Hatfield, Pa.; Sylvester L. Willard, and Larry A. Abramowski, both of Fredericksburg, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 25, 1986, Ser. No. 911,615

Int. Cl.[4] H01M 6/32

U.S. Cl. 429—116 3 Claims



1. An electrochemical reserve battery comprising in combination:

a housing including a separating wall forming two sealed chambers;

a stack of dry cells disposed in one of said chambers;

an expandable container occupying a portion of the space within the other of said chambers;

an electrolyte completely filling the unoccupied space at a pressure sufficient to collapse said container;

a source of high pressure gas within said container;

frangible means operatively connected between said source and said container for releasing the gas into said container at a preselected expansion thereof; and

actuating means operatively connected to said separating wall for selectively establishing communication between said chambers for permitting said electrolyte to transfer to said cells.

4,695,521

CONJUGATED POLYMER AS SUBSTRATE FOR THE PLATING OF ALKALI METAL IN A NONAQUEOUS SECONDARY BATTERY

Lawrence W. Shacklette; James E. Toth, both of Maplewood, and Ronald L. Elsenbaumer, Morristown, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Jun. 27, 1985, Ser. No. 749,325

Int. Cl.[4] H01M 10/40

U.S. Cl. 429—194 18 Claims

1. A battery comprising:

(a) an anode comprising a porous conjugated backbone polymer substrate, wherein said conjugated backbone polymer is reduced (n-doped) before or during the charging of said battery and, has dispersed therein elemental alkali metal;

(b) an electrolyte comprising an organic solvent containing dissolved alkali-metal salt, and

(c) a cathode;

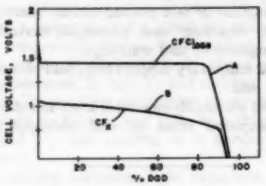
said alkali-metal from said electrolyte being electrodeposited in and/or onto said polymer substrate as elemental alkali metal during at least a part of the charging cycle of said battery, and said elemental alkali metal being converted into alkali metal cations during the discharging of said battery.

4,695,522

AQUEOUS BATTERY WITH $(C_yF_xCl_z)_n$ CATHODE

David Nalewajek, West Seneca; Jung T. Kim, Williamsville, and Lynn E. McCurry, Hamburg, all of N.Y., assignors to Allied Corporation, Morristownship, Morris County, N.J.

Continuation of Ser. No. 756,202, Jul. 18, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,280
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] H01M 4/58
U.S. Cl. 429—206 4 Claims



1. A novel high energy density aqueous cell comprising:
(a) a zinc anode;
(b) an aqueous electrolyte; and
(c) a $(C_yF_xCl_z)_n$ cathode wherein y has a value of greater than zero up to 2, x is greater than 0 up to 1.2, z is greater than 0 up to 0.1 and n denotes an infinitely large number for a two dimensional array of $C_yF_xCl_z$ units.

4,695,523

METHOD OF SCREENING A FLAT MASK CATHODE RAY TUBE

Kazimir Palac, Carpentersville, Ill., assignor to Zenith Electonics Corporation, Glenview, Ill.

Filed Apr. 26, 1985, Ser. No. 727,486
Int. Cl.[4] G03C 5/00; H01J 9/20
U.S. Cl. 430—23 9 Claims

1. For use in the manufacture of a color cathode ray tube which ultimately includes a tensed mask having a pattern of apertures, a method of photographically forming a pattern related to said pattern of apertures on a faceplate of said tube which method includes utilizing said tensed mask, said mask being held on a support frame that is subject to distortion when in a free state by forces exerted thereon by said tensed mask, the method comprising:
positioning said faceplate bearing a photosensitive coating in an exposure station and in registration with said mask support frame;
thermally expanding said tensed mask to reduce tension in said tensed mask and thereby reduce distortion in said support frame; and
exposing said faceplate borne photosensitive coating through said tensed mask, to energy actinic to said coating while said support frame is in its distortion-reduced state to thereby create a substantially undistorted latent image of said aperture pattern on said coating.

4,695,524

PROCESS FOR ULTRA HIGH QUALITY IMAGES WITH MAGNETIC DEVELOPER COMPOSITION

John F. Knapp, Fairport; Robert J. Gruber, Pittsford; Lawrence Floyd, Jr.; Steven B. Bolte, both of Rochester, and Michael G. Swales, Sodus, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 21, 1986, Ser. No. 865,327
The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.
Int. Cl.[4] G03G 13/00, 9/10
U.S. Cl. 430—32 29 Claims

1. A process for generating consistent high quality images comprised of (1) providing a xerographic imaging, or printing apparatus; (2) adding thereto a stable two component developer composition comprised of a toner composition with an average particle diameter of from about 6 to about 10 microns, and comprised of resin particles, first pigment particles, second magnetite pigment particles, which are present in a greater amount than the first pigment particles, and blended flow additive particles; and carrier particles consisting of a ferrite core, or a steel core, and a coating thereover selected from the group consisting of terpolymers of styrene, methacrylate, and organosilanes; and polymethacrylate, which coating has incorporated therein conductive particles; (3) forming electrostatic latent images, or magnetic images in the apparatus; and (4) developing the images formed, wherein the developer composition retains its electrical properties for an extended number of imaging cycles.

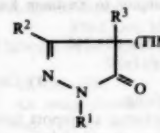
4,695,525

IMAGE FORMING PROCESS

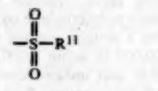
Masaaki Tsukase; Kozo Sato; Hiroshi Kitaguchi; Masashi Takeuchi, and Masatoshi Kato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

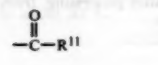
Filed Feb. 12, 1986, Ser. No. 828,481
Claims priority, application Japan, Feb. 12, 1985, 60-24665
Int. Cl.[4] G03C 5/18, 5/54, 1/34, 1/06
U.S. Cl. 430—151 12 Claims

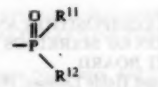
1. A process of forming images by heat developing a heat developable light-sensitive material after imagewise exposure, comprising heating a heat developable light-sensitive material in the presence of a nucleophilic reagent and a compound represented by general formula (I):



wherein R^1 represents a group represented by the following groups (A) to (C)







wherein R^{11} and R^{12}, which may be the same or different in formula (C), each represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted heterocyclic residue, a substituted or unsubstituted alkyloxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, or a substituted or unsubstituted amino group; said R^{11} and R^{12} may combine with each other to form a 5-membered or 6-membered ring in formula (C);

R^2 represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted heterocyclic residue, a substi-

tuted or unsubstituted alkyloxy group, a substituted or unsubstituted aryloxy group, a substituted or unsubstituted alkylthio group, a substituted or unsubstituted arylthio group, a substituted or unsubstituted amino group, a substituted or unsubstituted carbamoyl group, a carboxy group, an acylamino group, an acyloxy group, a sulfonylamino group, a cyano group, an alkyloxycarbonyl group, or an aryloxycarbonyl group;

R^3 represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aralkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted heterocyclic residue, or a group shown by $-(TIME)_n-(PUG)$;

said R^2 and R^3 may combine with each other to form a 5-membered or 6-membered ring;

TIME represents a timing group;

PUG represents a photographically useful group; and

n represents an integer of 0 to 3.

6. A process as claimed in claim 1, wherein (PUG) is selected from the group consisting of an antifoggant, a development inhibitor, a developing agent, a developing accelerator, an electron donor, a fogging agent, a nucleating agent, a silver halide solvent, a bleach accelerator, a blix accelerator, a fix accelerator, a dye, a coloring agent for color diffusion transfer process, a coupler, a melting point depressant for light-sensitive materials and a coupling inhibitor for diazo heat photography.

4,695,526

POLY(ETHYLENE OXIDE) STRIPPING AGENTS FOR PHOTOGRAPHIC PRODUCTS

John F. Bishop, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 11, 1986, Ser. No. 884,346

Int. Cl.[4] G03C *5/54, 1/90*

U.S. Cl. 430—215 **11 Claims**

1. A photographic product comprising

(a) A photographic element comprising a support having thereon at least one photosensitive silver halide emulsion layer;

(b) an image-receiving layer; and

(c) a stripping layer located between said photosensitive element and said image-receiving layer, wherein said stripping layer comprises a nonionic poly(ethylene oxide) homopolymeric compound having a weight average molecular weight of from about 200,000 to about 5,000,000 present in such concentration that said image-receiving layer can be cleanly separated, after processing, from the remaining layers of said product.

4,695,527

RADIATION-POLYMERIZABLE COMPOSITION AND PROCESS FOR THE APPLICATION OF MARKINGS TO A PRINTED CIRCUIT BOARD

Ulrich Geissler, Frankfurt am Main, and Heide Lampas, Hochheim, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 717,101, Mar. 28, 1985, abandoned. This application Jun. 17, 1986, Ser. No. 875,190

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1984, 3412992

Int. Cl.[4] G03C *5/00, 11/12*

U.S. Cl. 430—256 **18 Claims**

1. A process for the application of markings to a printed circuit board, comprising the steps of:

(i) laminating under pressure a solid thermoplastic photopolymerizable layer onto a supported, imagewise-exposed and developed solder-resist layer of a printed circuit board, said photopolymerizable layer being provided on a transparent, flexible temporary support and comprising

(a) a compound which has at least two terminal ethylenically unsaturated groups and which is capable of forming a crosslinked polymer by means of addition chain polymerization initiated by free radicals,

(b) a polymeric binder,

(c) a radiation-activatable polymerization initiator which forms free radicals,

(d) a compound which is thermally crosslinked with at least one from the group consisting of a polymerization product of said compound (a), said polymeric binder (b) and said compound (d) itself, and

(e) a finely-divided pigment which is dispersible in said photopolymerizable layer and which contrasts in color with the surface of said printed circuit board;

(ii) imagewise exposing said photopolymerizable layer through a negative of said markings;

(iii) peeling said temporary support from said photopolymerizable layer; and

(iv) treating said photopolymerizable layer in a developer to dissolve unexposed areas of said photopolymerizable layer.

4,695,528

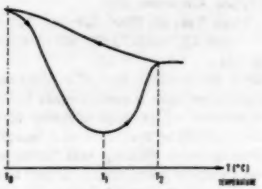
PROCESS FOR FORMING IMAGES USING BODY WITH REVERSIBLE FIXABLE AND TEMPERATURE-VARIABLE LIGHT EXTINCTIONS

Wolfgang H. Dabisch, Scharfensteinstr. 18, 6228 Eltville; Peter Kung, Kelkheim; Siegfried R. Muller, Destrich-Winkel, and Krishnamoorthy Narayanan, Eltville, all of Fed. Rep. of Germany, assignors to Wolfgang Dabisch, Fed. Rep. of Germany

Division of Ser. No. 123,582, Jul. 16, 1980, abandoned. This application Sep. 28, 1982, Ser. No. 425,763

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—290 **21 Claims**



1. An imaging process which comprises:

image-wise heating a body to a temperature in excess of T_0, and allowing said body to cool to a temperature of T_0 or below,

said body comprising at least one organic polymeric or resinous matrix material (A) and at least one organic low molecular material (B);

said material (B) having 10 to 60 carbon atoms, being at least partially insoluble in said material (A) and being contained in said material (A) as a dispersed second phase, exhibiting a change in volume of at least 5% upon changing from a solid phase to a liquid phase or changing from a liquid phase to a solid phase, and in the solid state at ambient temperature, exhibiting a refractive index which closely approximates or is the same as the refractive index of the material (A) and being selected from the group consisting of an alkanol; an alkandiol; a haloalkanol or a haloalkandiol; an alkylamine; an alkane; an alkene; an alkyne; a cycloaklane; a cycloalkene; or a cycloalkyne; a saturated or unsaturated mono- or -di-carboylic acid or an ester or an amide or an ammonium salt of the same; a saturated or unsaturated halogen fatty acid or an ester, an amide; or an ammonium salt of the same; an aryl carboxylic acid or an ester, an amide, or an ammonium salt thereof; a haloaryl carboxylic acid or an ester, an amide, or an ammonium salt

of the same; a thiol; a thiocarboxylic acid or an ester, an amide or an ammonium salt thereof; or a carboxylic acid ester of a thiol or mixtures thereof, wherein in the aforesaid esters the alcohol groups can be saturated or unsaturated and/or halogen-substituted,

said materials (A) and (B) being selected such that they provide said body with a variable light extinction characteristic at a temperature below a temperature T_0 in dependence upon prior heating to a temperature above T_0, said organic material (B) being present in a weight ratio to the matrix material (A) of approximately 1:3 to 1:16, said variable light extinction characteristic being such that maximum light extinction is obtained by heating said body above a temperature T_2 which lies above T_0 and cooling to a temperature below T_0; minimum light extinction is obtained by heating said body above a temperature T_1 lying between T_0 and T_2 and cooling to a temperature below T_0; and light extinctions of varying magnitude are obtained by heating said body to a temperature between T_0 and T_1, and cooling to a temperature below T_0; wherein;

images having maximum light extinction are obtained by image-wise heating said body when said body is in a state in which said body exhibits minimum light extinction at a temperature below T_0, to a temperature above a temperature T_2 and cooling to below T_0,

images having light extinction of diminishing magnitude are obtained by image-wise heating said body when said body is in a state in which said body exhibits maximum light extinction at a temperature below T_0, to a temperature T between T_0 and T_1, and cooling to below T_0, and

images of minimum light extinction are obtained by image-wise heating said body when said body is in a state in which said body exhibits maximum light extinction or extinction of diminished magnitude at a temperature below T_0, to a temperature between T_1 and T_2 and cooling to below T_0.

11. Am imaging process which comprises:

image-wise heating a body to a temperature in excess of room temperature, and allowing said body to cool from said temperature to room temperature;

said body comprising at least one organic polymeric or resinous matrix material (A) and at least one organic low molecular material (B);

said low molecular material (B) containing 10 to 60 carbon atoms, exhibiting a change in volume of at least 5% upon changing from a solid phase to a liquid phase or changing from a liquid phase to a solid phase, being at least partially insoluble in said material (A), exhibiting a solid state refractive index which closely approximates or is the same as the refractive index of said material (A), and being selected from the group consisting of:

an alkanol; an alkandiol; a haloalkanol or a haloalkandiol; an alkylamine; an alkane; an alkene; an alkyne; a cycloalkane; a cycloalkene; or a cycloalkyne; a saturated or unsaturated mono- or -di-carboxylic acid or an ester of an amide or an ammonium salt of the same; a saturated or unsaturated halogen fatty acid or an ester, an amide; or an ammonium salt of the same; an aryl carboxylic acid or an ester, an amide, or an ammonium salt thereof; a haloaryl carboxylic acid or an ester, an amide, or an ammonium salt of the same; a thiol; a thiocarboxylic acid or an ester, an amide or an ammonium salt thereof; or a carboxylic acid ester of a thiol or mixtures thereof, wherein in the aforesaid esters the alcohol groups can be saturated or unsaturated and/or halogen-substituted,

said matrix material (A) and said low molecular material (B) being present in said body in a weight ratio of said material (B) to said material (A) of approximately 1:3 to 1:16; and matrix material (A) and said low molecular material (B) being selected such that said body possesses a temperature variable light extinction at room temperature in dependence upon heating to a temperature above room temperature, said variable light extinction characteristic being such that maximum light extinction is obtained by heating said body to a temperature T_2 which lies above room temperature and cooling said body to room temperature; minimum light extinction is obtained by heating said body above a temperature T_1 which lies between room temperature and said temperature T_2 and cooling said body to room temperature; and light extinctions of varying magnitude are obtained by heating said body to a temperature between room temperature and said temperature T_1 and cooling said body to room temperature; wherein:

images of maximum light extinction are obtained by image-wise heating said body from a state in which said body exhibits minimum light extinction at room temperature, to a temperature above said temperature T_2 and cooling said body to room temperature;

images having light extinction of diminishing magnitude are obtained by image-wise heating said body from a state in which said body exhibits maximum light extinction at room temperature to a temperature T between room temperature and said temperature T_1, and cooling said body to room temperature, and

images of minimum light extinction are obtained by image-wise heating said body from a state in which said body exhibits maximum light extinction or light extinction of diminished magnitude at room temperature, to a temperature between said temperature T_1 and said temperature T_2 and cooling said body to room temperature.

4,695,529

IMAGE-FORMING PROCESS

Akira Abe; Junya Nakajima, and Toshihiro Nishikawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 15, 1986, Ser. No. 919,110

Claims priority, application Japan, Oct. 17, 1985, 60-232725

Int. Cl.[4] G03C *5/38, 7/42*

U.S. Cl. 430—351 **9 Claims**

1. An image-forming process, which comprises imagewise exposing a silver halide color photographic material comprising a support having provided thereon at least one silver halide emulsion layer containing tabular silver halide grains having a diameter-to-thickness ratio of 5 or more, subjecting the exposed photographic material to color development processing, then processing the photographic material in a bath mainly having a bleaching ability and successively in a bath having a bleach-fixing ability.

9. An image-forming process as claimed in claim 1, wherein the processing solutions are used at temperatures of about 10° C. to about 50° C.

4,695,530

METHOD FOR FORMING IMAGE USING SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Kotaro Nakamura, and Takatoshi Ishikawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 23, 1986, Ser. No. 854,976

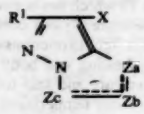
Claims priority, application Japan, Apr. 23, 1985, 60-87133

Int. Cl.[4] G03C *5/38, 5/44, 7/36, 7/42*

U.S. Cl. 430—381 **30 Claims**

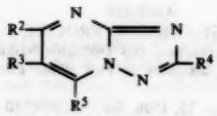
1. A method for forming an image in a silver halide color photographic light-sensitive material comprising developing an imagewise exposed silver halide color photographic light-sensitive material and then bleach fixing the silver halide color photographic light-sensitive material in a bleach fixing bath, the silver halide photographic color light sensitive material comprising a support having thereon a silver halide emulsion layer containing a yellow coupler, a silver halide emulsion layer containing a magenta coupler and a silver halide emulsion layer containing a cyan coupler, wherein the silver halide emulsion layer containing the magenta coupler contains at least

one pyrazoloazole type coupler represented by the general formula (I):

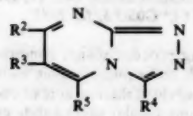


(I)

wherein R^1 represents a hydrogen atom or a substituent; X represents a hydrogen atom or a group capable of being released upon a coupling reaction with an oxidation product of an aromatic primary amine developing agent; Za, Zb and Zc each represents a methine group, a substituted methine group, —N= or —NH—, one of the Za-Zb bond and the Zb-Zc bond being a double bond and the other being a single bond; an aromatic ring may be condensed to the Zb-Zc bond; R^1 or X may form a polymer including a dimer or more; and when Za, Zb or Zc is a substituted methine group, the substituted methine group may form a polymer including a dimer or more; a photographic layer of the silver halide color photographic light-sensitive material or a processing solution contains at least 5.0×10^{-4} mol per mol of silver halide contained in the silver halide color photographic light-sensitive material of at least one compound represented by the formulae (II) or (III):



(II)



(III)

wherein R^2, R^3, R^4 and R^5, which may be the same or different, each represents a hydrogen atom, a hydroxy group, an aliphatic residue, an alkyl group substituted with an aromatic group, an alkyl group substituted with an alkoxy group, an alkyl group substituted with a hydroxy group, a carboxy group or an alkoxy carbonyl group or an aromatic residue; or R^2 and R^3 may be bonded each other to form a 5-membered or 6-membered saturate or unsaturated ring; and a developing agent which is introduced into the bleach-fixing bath is at least 1.0×10^{-4} mol per mol of a bleaching agent thereof.

2. A method for forming an image as claimed in claim 1, wherein the polymer of the pyrazoloazole type coupler is a bis coupler or a polymer coupler.

4,695,531

LIGHT-SENSITIVE ELEMENTS FOR RADIOGRAPHIC USE IN THE FORMATION OF AN X-RAY IMAGE

Gerolamo Delfino, Savona; Simone Franco, Ferrania, and Cesare Verdi, Carcare, all of Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

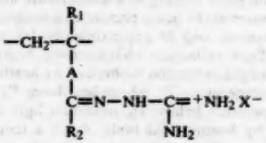
Filed Jul. 17, 1986, Ser. No. 887,121

Claims priority, application Italy, Jul. 25, 1985, 21716 A/85

Int. Cl.[4] G03C *1/84*

U.S. Cl. 430—513 **13 Claims**

1. A light-sensitive silver halide element for use with x-ray intensifying screens said element comprising a transparent support having coated on at least one of its sides one spectrally sensitized silver halide emulsion layer, said element containing, between the base and said one silver halide emulsion layer, a hydrophilic colloid layer of from 0.05 to 2 microns containing a water-soluble acid dye capable of being decolorized in the photographic processing and having absorption in a region of the electromagnetic spectrum corresponding to the spectral sensitivity of the silver halide emulsion, said dye being associated with a basic polymeric mordant, said mordant being present as from 1 to 30% by weight of said hydrophilic colloid, said element being characterized by the fact that said mordant comprises repeating units of formula:



wherein R_1 is hydrogen or a methyl group, A is a —COO— or —COO—alkylene group, R_2 is hydrogen or a lower alkyl group and X is an anion.

4,695,532

PHOTOGRAPHIC SILVER HALIDE ELEMENT CONTAINING NEW ADHESION PROMOTING POLYMERIC MATERIALS AND POLYESTER SUPPORT

Ignazio S. Ponticello, and Edward P. Otocka, both of Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 768,386, Aug. 22, 1985. This application Sep. 8, 1986, Ser. No. 905,014

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—533 **6 Claims**

1. A photographic element comprising a silver halide emulsion layer and a discharge-treated polyester film support having coated directly thereon a crosslinked layer of an aqueous polymer and gelatin coating composition wherein the polymer to gelatin ratio is in the range of 95:5 to 60:40 and the polymer comprises

(a) from 1 to 60 weight percent of recurring units derived from a polymerized vinyl monomer having a primary amine addition salt component or aminostyrene addition salt component;

(b) from 0 to 50 weight percent of recurring units derived from a polymerized hydrophilic vinyl monomer; and

(c) from 20 to 98 weight percent of recurring units derived from a polymerized hydrophobic nonionic vinyl monomer.

4,695,533

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Noritaka Nakayama; Satoshi Kawakatsu; Katsunori Katoh, all of Hachioji; Toshijumi Iijima, Kokubunji; Kenji Kumashiro, Hachioji; Hiroshi Kashiwagi, Hino; Koichi Hatta; Takashi Uchida, both of Hachioji; Hajime Wada, Tokyo; Fumio Ishii, Akishima; Satoshi Matsunaga, Hino; Yasuko Matsubara, Akishima, and Kaoru Shinozaki, Tokyo, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

PCT No. PCT/JP85/00510, § 371 Date May 28, 1986, § 102(e) Date May 28, 1986, PCT Pub. No. WO86/01915, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 12, 1985, Ser. No. 845,881

Claims priority, application Japan, Sep. 14, 1984, 59-193609; Dec. 26, 1984, 59-281182; Apr. 3, 1985, 60-70197

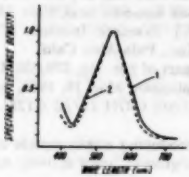
Int. Cl.[4] G03C *1/40, 7/38, 7/32*

U.S. Cl. 430—558 **7 Claims**

1. A silver halide photographic light-sensitive material characteristics a support bearing thereon at least one of silver halide emulsion layers. wherein at least one of said silver halide emulsion layers contains an 1H-pyrazolo[3,2-C-s-triazole magenta coupler substituted in the third position thereof by a group represented by the following Formula [I];

$-R_1-SO_2-R_2$ Formula [I]

wherein R_1 represents an alkylene group having not less than 3 carbon atoms in the straight-chained portion thereof, which



links said $-SO_2-R_2$ the carbon atom in the third position of the nucleus of the 1H-pyrazolo[3,2-C]-s--triazole; and R_2 represents an aryl group.

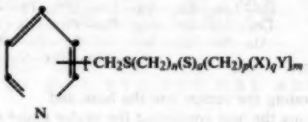
4,695,534

SILVER HALIDE PHOTOSENSITIVE MATERIAL

Philip S. Bryan, and Arthur H. Herz, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 29, 1986, Ser. No. 947,452
Int. Cl.[4] G03C *1/08*
U.S. Cl. 430—569 **20 Claims**

13. In a process for the preparation of a silver halide emulsion, the improvement which comprises adding, during preparation of said emulsion or prior to coating thereof on a support, from about 0.001 to about 10 g per mol of silver halide of a compound having the structural formula:



where

X is $NHCO(CH_2)_n$;

Y is hydrogen, hydroxyl or a carboxylic group of the formula COOR' where R' is hydrogen or an alkyl group having from 1 to about 5 carbon atoms;

a is 0 or 1;

n is 1 or 2;

p and q are each 0, 1 or 2; and

m is from 2 to 5,

or a quaternary ammonium salt thereof.

4,695,535

SILVER HALIDE PHOTOSENSITIVE MATERIAL

Philip S. Bryan, and Arthur H. Herz, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 29, 1986, Ser. No. 947,455
Int. Cl.[4] G03C *1/08*
U.S. Cl. 430—569 **13 Claims**

8. In a process for the preparation of a silver halide emulsion, the improvement which comprises adding, during preparation of said emulsion or prior to coating thereof on a support, from about 0.001 to about 10 g per mol of silver halide of a compound having the structural formula:

$$HO_2C(C_2H_4S)_2(CH_2)_n(CHR^1)_n(CHR^2)_n(SC_2H_4)_2CO_2H$$

wherein

R^1 is hydrogen, hydroxy or —COOH;

R^2 is hydrogen or $-(CH_2)_2COOH$; and

each n is independently 1 or 2,

or an alkali metal or ammonium salt thereof.

4,695,536

CORNEAL STORAGE SYSTEM

Richard L. Lindstrom, 20050 Lakeview Ave., Excelsior, Minn. 55391; Donald J. Doughman, 5228 W. Highwood Dr., Edina, Minn., and Debra Skelnik, P.O. Box 344, Cambridge, Minn. 55008

Filed Jan. 10, 1984, Ser. No. 569,609
Int. Cl.[4] A01N *1/02*
U.S. Cl. 435—1 **14 Claims**

1. Corneal storage media comprising 500 ml Gibco's minimum essential media (Eagles) with Earls salts, 25 mM HEPES buffer without L-glutamine; 50 ml of decomplemented calf serum or 25 ml of decomplemented calf serum and 25 ml of decomplemented fetal calf serum or 50 ml of decomplemented fetal calf serum at a 10 percent final concentration of final media volume; 5 ml of L-glutamine (200 mM) at 1 percent final concentration of final media volume; chondroitin sulfate at 1 percent of 10 percent to final media volume; and, antibiotics of 10,000 units/ml of penicillin plus 50–100 ug/ml of garamycin (plus or minus 0.25 ug/ml of amphotericin B) whereby the solution is equilibrated to 7.2–7.6 pH through 5 percent CO_2 and 95 percent air.

4,695,537

PARTICLES SENSITIZED WITH DETERGENT-TREATED ANTIGEN FOR AGGLUTINATION IMMUNOASSAY

Preston H. Dorsett, Memphis, Tenn., assignor to The University of Tennessee Research Corp., Knoxville, Tenn.

Continuation-in-part of Ser. No. 380,537, May 21, 1982, Pat. No. 4,590,156. This application Apr. 25, 1985, Ser. No. 727,661
Int. Cl.[4] G01N *33/546, 33/547*
U.S. Cl. 435—5 **28 Claims**

1. A composition, comprising:

a solid particulate support and a detergent-treated antigen supported on said support, said antigen being an intracellular parasite antigen, said antigen having been treated with a detergent to provide a solid support sensitized with the detergent-treated antigen which is is resistant to self-agglutination.

6. The composition of claim **1** wherein said antigen has been treated with a detergent prior to being supported on the support.

4,695,538

HUMAN MONOCLONAL ANTIBODIES TO CELL SURFACE ANTIGENS

Richard J. Cote; Timothy M. Thomson; Alan N. Houghton, all of New York, N.Y.; Herbert F. Oettgen, New Canaan, Conn.; Lloyd J. Old, and Carlos C. Cardo, both of New York, N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Filed Jun. 1, 1984, Ser. No. 616,397
Int. Cl.[4] G01N *33/53, 33/577*
U.S. Cl. 435—7 **12 Claims**

1. Hybridoma cell lines which produce human monoclonal antibodies which specifically bind to cell surface antigens and intracellular components of human cells, said cell lines selected from the group consisting of HB8565, HB8572, HB8573, HB8574, HB8575, HB8576, and HB8577.

4,695,539

PROCESS FOR QUANTITATIVE DETERMINATION OF SUBSTRATE TREATED WITH OXIDASE

Yoshitsugu Sakata, Otsu; Yoshibonu Miyashita, Osaka; Tadashi Hamanaka, Kobe; Hiroyuki Kodera; Yutaka Miki, both of Amagasaki; Kazuhiko Yamanishi, Tokyo, and Toshiro Hanada, Kawagoe, all of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Jul. 22, 1983, Ser. No. 516,241

Claims priority, application Japan, Sep. 29, 1982, 57-170639

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] C12Q *1/62, 1/60, 1/54, 1/26, 1/28*

U.S. Cl. 435—10 9 Claims

1. A process for quantitatively determining a substrate, which comprises treating a sample containing a substrate selected from the group consisting of glucose, glycerol, glycerol phosphate, choline, cholesterol, acyl CoA, pyruvic acid, uric acid, xanthine and lactic acid with a specific oxidase corresponding to said substrate, and measuring the generated superoxide ion by using a reagent composition comprising (a) the specific oxidase, (b) a peroxidase, (c) a phenol and/or an amine, (d) a thiol compound in an amount effective to retard the conversion of superoxide into hydrogen peroxide, and (e) a color producing reagent to be reduced.

4,695,540

QUANTITATIVE DETERMINATION OF SUBSTRATE TREATED WITH OXIDASE

Kazuhiko Yamanishi, Tokyo, and Toshiro Hanada, Kawagoe, both of Japan, assignors to Wako Pure Chemical Industries, Ltd., Osaka, Japan

Filed Jul. 22, 1983, Ser. No. 516,271

Claims priority, application Japan, Jul. 23, 1982, 57-128700; Jun. 20, 1983, 58-110423

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.[4] C12Q *1/62, 1/60, 1/54, 1/26, 1/28*

U.S. Cl. 435—10 6 Claims

1. A process for quantitatively determining a substrate, which comprises treating a sample containing a substrate with a specific oxidase corresponding to said substrate and measuring the generated superoxide ion, said oxidase treatment and measuring of generated superoxide ion conducted by measuring color formation or color change being conducted by using a reagent composition comprising (a) the specific oxidase corresponding to the substrate to be determined, (b) iron complex of porphyrin or iron chelate, (c) an amine and/or a phenol, (d) a thiol compound in an amount effective to retard the conversion of superoxide into hydrogen peroxide, and (e) a color producing reagent to be reduced.

4,695,541 •

ENZYMATIC DETECTION OF BACTERIAL CAPSULAR POLYSACCHARIDE ANTIGENS

Peter W. Taylor, West Haven, Conn., assignor to Molecular Diagnostics, Inc., West Haven, Conn.

Filed Jan. 31, 1985, Ser. No. 696,827

Int. Cl.[4] C12N *9/24;* C12Q *1/00, 1/34*

U.S. Cl. 435—18 16 Claims

1. A substantially pure enzyme which hydrolyzes a polymer containing alpha 2,8-linked N-acetyl neuraminic acid, said enzyme derived from the tail structure of K-1 specific bacteriophages, said enzyme having a molecular weight of 208,000d, said enzyme characterized by not being able to release α2,3-, α2,6- and α2,9-linked sialyl residues and said enzyme having a maximal activity in the pH range of 5.2 to 5.5.

4,695,542

CDNA CLONES CODING FOR POLYPEPTIDES EXHIBITING MULTI-LINEAGE CELLULAR GROWTH FACTOR ACTIVITY

Takashi Yokota; Frank Lee, both of Palo Alto; Donna Rennick, Los Altos Hills, and Ken-ichi Arai, Palo Alto, all of Calif., assignors to DNAX Research Institute of Molecular and Cellular Biology, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 539,050, Oct. 4, 1983, abandoned. This application Mar. 19, 1984, Ser. No. 590,867

Int. Cl.[4] C12P *21/00;* C07H *15/12;* C12N *15/00, 1/00*

U.S. Cl. 435—68 17 Claims

1. A process for producing a polypeptide exhibiting mouse multi-lineage cellular growth factor activity, said process comprising the steps of:

providing a vector comprising a nucleotide sequence coding for said polypeptide, wherein the nucleotide sequence is capable of being expressed by a host containing the vector and wherein the nucleotide sequence is selected from the group of nucleic acids capable of encoding a polypeptide having an amino acid sequence defined by the formula:

Asp—Thr—His—Arg—Leu—Thr—Arg—Thr—
—Leu—Asn—Cys—Ser—Ser—Ile—Val—Lys—
—Glu—Ile—Ile—Gly—Lys—Leu—Pro—Glu—
—Pro—Glu—Leu—Lys—Thr—Asp—Asp—Glu—
—Gly—Pro—Ser—Leu—Arg—Asn—Lys—Ser—
—Phe—Arg—Arg—Val—Asn—Leu—Ser—Lys—
—Phe—Val—Glu—Ser—Gln—Gly—Glu—Val—
—Asp—Pro—Glu—Asp—Arg—Tyr—Val—Ile—
—Lys—Ser—Asn—Leu—Gln—Lys—Leu—Asn—
—Cys—Cys—Leu—Pro—Thr—Ser—Ala—Asn—
—Asp—Ser—Ala—Leu—Pro—Gly—Val—Phe—
—Ile—Arg—Asp—Leu—Asp—Asp—Phe—Arg—
—Lys—Lys—Leu—Arg—Phe—Tyr—Met—Val—
—His—Leu—Asn—Asp—Leu—Glu—Thr—Val—
—Leu—Ala—Ser—Arg—Pro—Pro—Gln—Pro—
—Ala—Ser—Gly—Ser—Val—Ser—Pro—Asn—
—Arg—Gly—Thr—Val—Glu—Cys

incorporating the vector into the host; and

maintaining the host containing the vector under conditions suitable for expression of the nucleotide sequence into said polypeptide.

4,695,543

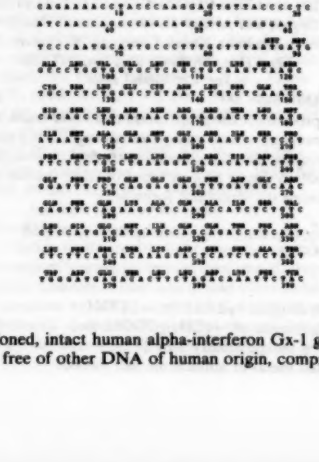
ALPHA INTERFERON GX-1

Alan Sloma, Silver Spring, Md., assignor to Bristol-Myers Company, New York, N.Y.

Continuation of Ser. No. 361,364, Mar. 23, 1982, abandoned. This application Apr. 24, 1984, Ser. No. 602,275

Int. Cl.[4] C12P *21/02, 21/00, 21/04, 19/34;* C12N *15/00, 1/00, 1/20;* C07H *21/04*

U.S. Cl. 435—70 19 Claims



1. A cloned, intact human alpha-interferon Gx-1 gene, substantially free of other DNA of human origin, comprising the

following deoxyribonucleotide sequence, along with the corresponding amino acid sequence for which said deoxyribonucleotide sequence codes:

	CYS	ASN	LEU	SER	GLN	THR	HIS
5'	TGY	AAY	YTZ	QRS	CAM	ACX	CAY

SER	LEU	ASN	ASN	ARG	ARG	THR
QRS	YTZ	AAY	AAY	LGN	LGN	ACX

LEU	MET	ILE	MET	ALA	GLN	MET
YTZ	ATG	ATH	ATG	GCX	CAM	ATG

GLY	ARG	ILE	SER	PRO	PHE	SER
GGX	LGN	ATH	QRS	CCX	TTY	QRS

CYS	LEU	LYS	ASP	ARG	HIS	ASP
TGY	YTZ	AAM	GAY	LGN	CAY	GAY

PHE	GLY	PHE	PRO	GLN	GLU	GLU
TTY	GGX	TTY	CCX	CAM	GAM	GAM

PHE	ASP	GLY	ASN	GLN	PHE	GLN
TTY	GAY	GGX	AAY	CAM	TTY	CAM

LYS	ALA	GLN	ALA	ILE	SER	VAL
AAM	GCX	CAM	GCX	ATH	QRS	GTX

LEU	HIS	GLU	MET	ILE	GLN	GLN
YTZ	CAY	GAM	ATG	ATH	CAM	CAM

THR	PHE	ASN	LEU	PHE	SER	THR
ACX	TTY	AAY	TYZ	TTY	QRS	ACX

LYS	ASP	SER	SER	ALA	THR	TRP
AAM	GAY	QRS	QRS	GCX	ACX	TGG

ASP	GLU	THR	LEU	LEU	ASP	LYS
GAY	GAM	ACX	YTZ	YTZ	GAY	AAM

PHE	TYR	THR	GLU	LEU	TYR	GLN
TTY	TAY	ACX	GAM	YTZ	TAY	CAM

GLN	LEU	ASN	ASP	LEU	GLU	ALA
CAM	YTZ	AAY	GAY	YTZ	GAM	GCX

CYS	MET	MET	GLN	GLU	VAL	GLY
TGY	ATG	ATG	CAM	GAM	GTX	GGX

VAL	GLU	ASP	THR	PRO	LEU	MET
GTX	GAM	GAY	ACX	CCX	YTZ	ATG

ASN	VAL	ASP	SER	ILE	LEU	THR
AAY	GTX	GAY	QRS	ATH	YTZ	ACX

VAL	ARG	LYS	TYR	PHE	GLN	ARG
GTX	LGN	AAM	TAY	TTY	CAM	LGN

ILE	THR	LEU	TYR	LEU	THR	GLU
ATH	ACX	YTZ	TAY	YTZ	ACX	GAM

LYS	LYS	TYR	SER	PRO	CYS	ALA
AAM	AAM	TAY	QRS	CCX	TGY	GCX

-continued

TRP	GLU	VAL	VAL	ARG	ALA	GLU
TGG	GAM	GTX	GTX	LGN	GCX	GAM

ILE	MET	ARG	SER	PHE	SER	LEU
ATH	ATG	LGN	QRS	TTY	QRS	YTZ

SER	ALA	ASN	LEU	GLN	GLU	ARG
QRS	GCX	AAY	YTZ	CAM	GAM	LGN

LEU	ARG	ARG	LYS	GLU	
YTZ	LGN	LGN	AAM	GAM	3'

wherein the 5' to 3' strand, beginning with the amino terminus and the amino acids for which each triplet codes are shown, and wherein

A is deoxyadenyl
T is thymidyl
G is deoxyguanyl
C is deoxycytosyl
X is A, T, C or G
Y is T or C
when Y is C, Z is A, T, C or G
when Y is T, Z is A or G
H is A, T or C
Q is T or A
when Q is T, R is C and S is A, T, C or G
When Q is A, R is G and S is T or C
M is A or G
L is A or C
when L is A, N is A or G
when L is C, N is A, T, C or G
GLY is glycine
ALA is alanine
VAL is valine
LEU is leucine
ILE is isoleucine
SER is serine
THR is threonine
PHE is phenylalanine
TYR is tyrosine
TRP is tryptophan
CYS is cysteine
MET is methionine
ASP is aspartic acid
GLU is glutamic acid
LYS is lysine
ARG is arginine
HIS is histidine
PRO is proline
GLN is glutamine
ASN is asparagine.

4,695,544

PROCESS FOR THE PREPARATION OF CHOLECYSTOKININ ANTAGONISTS

Richard L. Monaghan, Somerset; Michael A. Goetz, Fanwood, and Raymond S. Chang, Edison, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

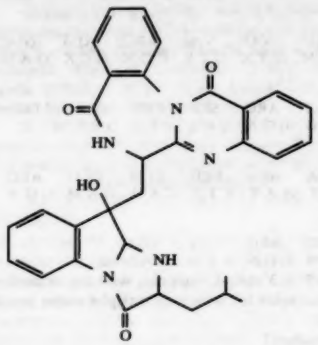
Continuation of Ser. No. 509,883, Jul. 1, 1983, Pat. No. 4,530,790, which is a continuation-in-part of Ser. No. 453,383, Dec. 27, 1982, abandoned. This application Mar. 15, 1985, Ser. No. 712,046

Int. Cl.[4] C12N *1/14*; C12P *17/18*; C12R *1/66*

U.S. Cl. 435—119 **6 Claims**

1. A process for preparing the compund of Formula I;

(I)



and its minor related components A, B, C and D which comprises the aerobic fermentation of a strain of *Aspergillus alliaceus* Thom and Church that is capable of producing said compound and its minor related components A, B, C and D wherein said aerobic fermentation is under operating conditions and a time period that are controlled so as to produce a recoverable amount of said compound or one of its minor related components A, B, C, and D in an assimilable aqueous nutrient medium and isolating at least one of said compound and its minor related components A, B, C and D.

4,695,545

CULTURE AND PROCESS FOR PRODUCING A41030 ANTIBIOTICS

Walter M. Nakatsukasa, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 361,302, Mar. 24, 1982, abandoned. This application May 7, 1984, Ser. No. 607,907

The portion of the term of this patent subsequent to Aug. 5, 2003, has been disclaimed.

Int. Cl.[4] **C12P** *17/18, 21/04, 17/00, 17/16;* **C12N** *1/20;* **C12R** *1/465;* **A61K** *35/00;* **C07K** *15/00*

U.S. Cl. 435—119 **4 Claims**

1. A method of producing the A41030 antibiotic complex which comprises cultivating *Streptomyces virginiae* NRRL 12525, or an A41030-producing variant or mutant thereof, in a culture medium containing assimilable sources of carbon, nitrogen, and inorganic salts under submerged aerobic fermentation conditions until a substantial amount of antibiotic A41030 activity is produced by said organism in said culture medium and recovering said culture medium having said antibiotic A41030 activity.

4,695,546

TRANSFORMING *BACILLUS STEAROTHERMOPHILUS* WITH PLASMID VECTOR PTB 19

Shuichi Aiba, and Tadayuki Imanaka, both of Suita, Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

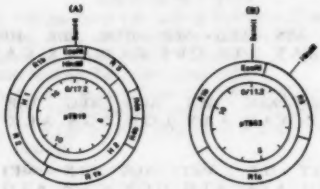
Filed Mar. 8, 1982, Ser. No. 356,150

Claims priority, application Japan, Mar. 6, 1981, 56-32809; Mar. 6, 1981, 56-32810

Int. Cl.[4] **C12N** *15/00*

U.S. Cl. 435—172.3 **1 Claim**

1. A process for the transformation of a microorganism of the species *Bacillus stearothermophilus,* which microorganism is thermophilic and is gram-positive or gram-variable, which comprises introducing into said microorganism, which is in the protoplast state at a temperature of about 40° to 70° C., a



plasmid comprising the vector pTB 19, said plasmid having been retained in *Bacillus subtilis* FERM-P5895.

4,695,547

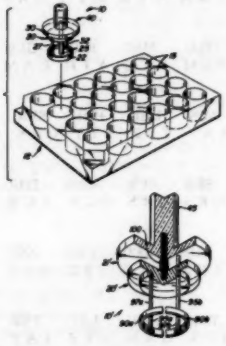
PROBE FOR ELECTROFUSION, ELECTROPORATION, OR LIKE PROCEDURE

Jeffrey L. Hilliard, 5256 El Cemonte, Davis, Calif. 95616, and Maurice M. Moloney, Davis, Calif., assignors to Jeffrey L. Hilliard, Davis, Calif.

Filed Apr. 2, 1986, Ser. No. 847,356

Int. Cl.[4] **C12N** *13/00*

U.S. Cl. 435—173 **13 Claims**



1. A probe for insertion into a cylindrical well for subjecting a sample of genetic material in the well to the action of an electric field, comprising:

a metal ring having an outer diameter slightly less than the inner diameter of the well to permit free insertion of said ring into the well coaxial with respect to the well;

a cover;

a metal rod having an outer diameter less than the inner diameter of said ring and extending through said cover such that one end of said rod defines a first electrical terminal above said cover and the other end of said rod is proximate the bottom of the well when the probe is inserted into the well; and

a metal pin extending through said cover and having a first end defining a second electrical terminal above said cover and a second end rigidly and electrically joined to said ring such that the lower edge of said ring is proximate the bottom of the well when the probe is inserted into the well;

said cover holding said rod coaxial with respect to the well when said ring is inserted into the well coaxial with respect to the well.

4,695,548

GEL INSERTS USEFUL IN ELECTROPHORESIS

Charles R. Cantor, and David C. Schwartz, both of New York, N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation-in-part of Ser. No. 442,580, Nov. 18, 1982, Pat. No. 4,473,452. This application Sep. 25, 1984, Ser. No. 654,641

Int. Cl.[4] C12N *11/12*

U.S. Cl. 435—179 7 Claims

1. A gel insert useful for electrophoretic separations which comprises a gel matrix consisting of a solidified agarose or acrylamide suitable for use in an electrophoretic method and entrapped within the gel matrix are lysed cells and macromolecules derived from the lysed cells.

5. A method of preparing a gel insert of claim 1 which comprises suspending cells in a liquid agarose or acrylamide suitable for use in an electrophoretic method, allowing the agarose or acrylamide to form a gel matrix in which the suspended cells are entrapped, diffusing a cell lysing reagent into the gel matrix containing the suspended cells so as to lyse the cells, and yield lysed cells and macromolecules derived from the lysed cells entrapped in the gel matrix.

4,695,549

METABOLICALLY ACTIVE PREPARATIONS OBTAINED FROM YEAST OF ANY TYPE

Ernst B. Grabitz, Casatenovo, Italy, assignor to Hasunor A.G., Lugano, Switzerland

Filed May 7, 1984, Ser. No. 607,563

Claims priority, application Switzerland, May 20, 1983, 2787/83

Int. Cl.[4] C07G *17/00*; C12N *1/06*; C12R *1/85*; A61K *35/78*

U.S. Cl. 435—267 9 Claims

1. A process for obtaining a sterile, pyrogen-, histamine- and protein-free solution containing at least 1.4 mg/ml of nitrogen, useful as a promoter of oxidative phosphorylation, which comprises the steps:

(a) plasmolyzing an aqueous dispersion of yeast at a temperature of less than 0° C.,

(b) adding a proteolytic enzyme,

(c) adding a diamine oxidase in order to remove histamine,

(d) adding a mixture of a monovalent C_2–C_6 aliphatic alcohol with two or more polyvalent alcohols containing at least 3 carbon atoms, to precipitate protein,

(e) separating liquid by filtration or centrifugation,

(f) adding a buffer solution to stabilize the separated liquid at pH 6–7, and

(g) concentrating the stabilized liquid under vacuum said liquid being a sterile, pyrogen-, histamine- and protein-free solution containing at least 1.4 mg/ml of nitrogen.

4,695,550

ATP: POLYNUCLEOTIDE ADENYLYLTRANSFERASE ENZYME AND METHOD OF PREPARATION THEREOF

Rusty J. Mans, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.

Filed Jun. 5, 1984, Ser. No. 617,596

Int. Cl.[4] C12N *9/12*

U.S. Cl. 435—194 31 Claims

1. A method of preparing ATP: polynucleotide adenylyltransferase enzyme in substantially pure form comprising the sequential steps;

(a) homogenizing monocotyledonous plant tissue in an aqueous medium buffered to a mildly alkaline pH to solubilize said enzyme and separating isoluble material from said solution;

(b) dissolving in the aqueous solution obtained in step (a) the minimum amount of soluble, inert salt necessary to precipitate substantially all of said enzyme and separating said precipitated enzyme from said solution;

(c) dissolving said precipitated enzyme from step (b) in an aqueous medium buffered to a mildly alkaline pH;

(d) removing from the solution produced in step (c) any low molecular weight cellular components dissolved therein and adjusting the inert salt ionic strength thereof to from about 0.45M to about 0.75M;

(e) contacting the solution from step (d) with a weak anion exchange resin whereby nucleic acids, competing enzymic activities and proteinaceous impurities are chromatographically adsorbed thereby to the exclusion of said ATP enzyme;

(f) isolating said ATP enzyme following said chromatographic separation of step (e), dissolving said enzyme in an aqueous medium buffered to a mildly alkaline pH and adjusting the inert salt ionic strength thereof to from about 30 mM to about 75 mM;

(g) contacting the solution of step (f) with a weak anion exchange resin whereby said ATP enzyme is chromatographically adsorbed thereby to the exclusion of proteinaceous impurities;

(h) eluting the adsorbed enzyme from said resin and dialyzing the eluted fraction from step (g) against an aqueous solution buffered to a mildly acid pH and having an ionic strength of dissolved inert salt of from about 10 mM to about 30 mM;

(i) contacting said dialyzed fraction with a weak cation exchanger to chromatographically adsorb therefrom the ATP enzyme to the exclusion of proteinaceous impurities from which the adsorbed enzyme is separated after elution from said weak cation exchanger with an aqueous medium buffered to a mildly acid pH and having an inert salt ionic strength of from about 50 mM to about 200 mM;

(j) contacting said eluted fraction with a polynucleotide covalently bound to an inert matrix to chromatographically adsorb therefrom the ATP enzyme to the exclusion of proteinaceous impurities from which the adsorbed enzyme is separated after elution from said bound polynucleotide with an aqueous medium buffered to an alkaline pH and having an inert salt concentration of from about 50 mM to about 200 mM.

4,695,551

SAMPLING APPARATUS FOR A BIOLOGICAL REACTOR

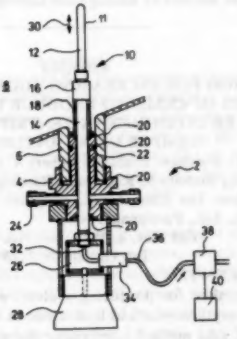
Wolfgang Samhaber, and Werner Renn, both of Allschwil, Switzerland, assignors to Proton AG, Zug, Switzerland

Filed Apr. 21, 1986, Ser. No. 854,174

Claims priority, application Fed. Rep. of Germany, May 4, 1985, 3516080

Int. Cl.[4] C12M *1/26*

U.S. Cl. 435—292 13 Claims



1. A sampling apparatus for a bioreactor having a connection port, comprising:

a probe having a head region operatively coacting with said bioreactor;

said head region comprising a semipermeable membrane defining a microfilter;

a conduit operatively coupled with said microfilter for sampling contents of the bioreactor;

said semipermeable membrane having an outer surface;

means operatively connected with said semipermeable membrane for moving said outer surface of said semipermeable membrane;

a probe housing;

said semipermeable membrane together with said probe being displaceably mounted in said probe housing;

sealing means;

said probe including a section of pipe having a first end and a second end;

said sealing means sealingly interconnecting said section of pipe and at least part of said probe housing and sealing said probe housing from the contents of said bioreactor;

a coupling housing;

said section of pipe possessing on said first end said semipermeable membrane and on said second end said coupling housing;

said coupling housing being connected with said means for moving said outer surface of said semipermeable membrane; and

said conduit being connected to said section of pipe.

4,695,552

PROCESS AND REAGENT FOR THE DETERMINATION OF THE HEMOGLOBIN-HAPTOGLOBIN COMPLEX IN THE PRESENCE OF FREE HEMOGLOBIN

Urban Schmitt, Tutzing; Rolf Deeg, Bernried, and Joachim Ziegenhorn, Starnberg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Apr. 19, 1984, Ser. No. 601,801

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1983, 3314308

Int. Cl.[4] G01N *33/72;* **C12Q** *1/28*

U.S. Cl. 436—66 **14 Claims**

1. A process for the determination of the hemoglobin-haptoglobin complex in a sample containing free hemoglobin comprising the steps of adding a detergent to the sample to be determined, in an effective amount to almost completely inactivate the peroxidase activity of the free hemoglobin without substantially changing the peroxidase activity of the hemoglobin-haptoglobin complex, and thereafter measuring the residual peroxidase activity of the reaction mixture as a measure of the amount of hemoglobin-haptoglobin complex.

4,695,553

METHOD FOR INCREASING AGGLUTINATION OF GROUPS OF CELLS TO PRODUCE IMPROVED CELL LAYER INTERFACE IN CENTRIFUGED BLOOD SAMPLE USING ANTIBODIES

Stephen C. Wardlaw, Branford; Robert A. Levine, Guilford, both of Conn.; Rodolfo R. Rodriguez, Randolph, N.J., and Michael R. Loken, Los Altos, Calif., assignors to Becton Dickinson and Co., Inc., Parsippany, N.J.

Filed Nov. 1, 1985, Ser. No. 794,127

Int. Cl.[4] G01N *1/18*

U.S. Cl. 436—177 **13 Claims**

1. A method for producing a clear, well-defined interface between erythrocytes and leukocytes in a centrifuged sample of blood, said method comprising the step of adding to the blood sample an effective amount of a monoclonal antibody which causes all erythrocytes in the blood sample to agglutinate so as to form multi erythrocyte groups effective to impart to all of the erythrocytes a group density which substantially equals the mean erythrocyte density of the blood sample.

4,695,554

SAC OR LIPOSOME CONTAINING DYE (SULFORHODAMINE) FOR IMMUNOASSAY

James P. O'Connell, Chapel Hill, N.C.; Uri Piran, Norwood, Mass., and Daniel B. Wagner, Raleigh, N.C., assignors to Becton Dickinson and Company, Franklin Lakes, N.J.

Continuation-in-part of Ser. No. 579,667, Feb. 14, 1984, and a continuation-in-part of Ser. No. 650,200, Sep. 13, 1984. This application Mar. 27, 1985, Ser. No. 716,533

Int. Cl.[4] G01N *33/533;* **B01J** *13/02*

U.S. Cl. 436—528 **21 Claims**

10. A composition, comprising:

a sac, said sac including a sulforhodamine dye.

11. In an assay for an analyte in a sample wherein a sac employing a detectable marker is employed as a measure of analyte, the improvement comprising:

detecting, as a measure of analyte, a sulforhodamine dye present in a sac as defined in claim 10.

4,695,555

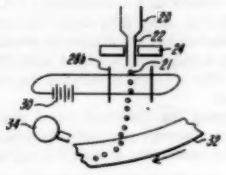
LIQUID CHROMATOGRAPHIC DETECTOR AND METHOD

Andrew F. O'Keeffe, 4801 Deerwood Dr., Raleigh, N.C. 27612

Continuation of Ser. No. 743,895, Jun. 12, 1985, abandoned. This application Oct. 30, 1986, Ser. No. 924,119

Int. Cl.[4] G01N *27/00, 30/64*

U.S. Cl. 436—150 **14 Claims**



11. A method of detecting the solute burden of effluent of a liquid chromatograph column comprising the steps of:

emitting an effluent liquid stream, as uniformly sized spherical droplets, through an orifice in the liquid chromatograph column at a constant rate and over a common path, said emitted droplets being imparted with an electric charge, the amount of said electric charge acquired by each droplet being dependent upon the nature and quantity of the solute carried by said droplet:

passing each of said droplets through an electric field which causes each of said droplets to deflect off said common path by a distance dependent on the solute burden in said droplet;

providing an electrically neutral, relatively non conducting recording medium;

positioning said recording medium so that said droplets passing through the electric field will impinge on said recording medium;

processing said recording medium so as to render said impinging droplets visible.

4,695,556

CATALYST RESINS AND PROCESS FOR THEIR PREPARATION

Siegfried Oeckl, Bergisch Gladbach; Alfred Mitschker, Odenthal-Holz; Peter M. Lange, Leverkusen, and Friedrich Martinola, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 909,995

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1986, 3626581

Int. Cl.[4] B01J *31/08, 31/10, 37/30*

U.S. Cl. 502—11 9 Claims

5. In the process for the preparation of a strongly acid cation exchanger loaded with a catalytically active metal by loading the cation exchanger with a solution of a salt of the catalytically active metal and reducing the cation exchanger loaded with the metal ions, the improvement which comprises carrying out the loading of the cation exchanger at a temperature of from 50° to 120° C. and using formic acid as the reducing agent.

4,695,557

CATALYST FOR POLYMERIZATION OF OLEFINS

Shigeo Suzuki; Yoshiharu Doi, and Kazuo Soga, all of Kanagawa, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 17, 1986, Ser. No. 875,145

Claims priority, application Japan, Jun. 18, 1985, 60-130885

Int. Cl.[4] C08F *4/68*

U.S. Cl. 502—103 7 Claims

1. A catalyst system comprising a vanadium chelate of a beta-ketoaldehyde and an organoaluminum compound.

4,695,558

CATALYSTS FOR HOMO- AND COPOLYMERIZATION OF ETHYLENE AND THE POLYMERS OBTAINED BY USE THEREOF

Enrico Albizzati, Arona; Enrico Pettenati, Milan; Umberto Zucchini, and Illaro Cuffiani, both of Ferrara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 19, 1985, Ser. No. 713,557

Claims priority, application Italy, Mar. 20, 1984, 20139 A/84

The portion of the term of this patent subsequent to Sep. 18, 2001, has been disclaimed.

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—123 13 Claims

1. Catalysts for the polymerization of ethylene and of mixtures thereof with other olefins, comprising the product of reaction between the following components:

(a) an Al-alkyl compound;

(b) an electron-donor compound containing at least a nitrogen atom and reactive towards $MgCl_2$, but not towards Al-triethyl under standard reaction conditions, compound (b) being used in a molar ratio with respect to compound (a), of 0.1 to 10;

(c) the reaction product between at least a titanium compound containing at least a Ti-halogen bond and an anhydrous magnesium dihalide.

4,695,559

CATALYST FOR THE SELECTIVE REDUCTION OF NITROGEN OXIDES IN WASTE GASES AND PROCESS FOR THE MANUFACTURE OF SUCH A CATALYST

Dietrich Wagener, Essen; Karl H. Laue, Hattingen; Egmar Wunderlich, Mülheim; Theo Sander, Essen; Claus Flockenhaus, Essen; Erich Hackler, Essen; Biagoje Levkov, Wiesbaden; Daniel Grimm, Schlangenbad-Bärstadt; Hartmut Kainer, Wiesbaden; Hermann Stein, Bad Dürkheim; Hans-Eugen Bühler, Königstein; Horst Kalfa, Idstein; Johann Jansen, Duisburg; Werner Stender, Raesfeld, and Arnold Max, Bottrop, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden and Didier Engineering GmbH, Essen, both of, Fed. Rep. of Germany

Filed Feb. 19, 1986, Ser. No. 831,142

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1985, 3505648

Int. Cl.[4] B01J *21/18, 27/053, 27/18*

U.S. Cl. 502—183 17 Claims

1. A catalyst for selective reduction of nitrogen oxides, said catalyst being a catalyst for reacting waste gases with ammonia, said catalyst comprising:

a mixture of two basic substances which are A and B, and wherein the basic substance A comprises the following components:

about 89 to about 92 percent by weight of Fe_2O_3;

about 3 to about 4 percent by weight of Fe_3O_4;

about 4 to about 5 percent by weight of SiO_2;

about 1 to about 2 percent by weight of Al_2O_3;

about 0.01 to about 0.2 percent by weight of MnO;

about 0.01 to about 0.03 percent by weight of CaO;

about 0.01 to about 0.02 percent by weight of MgO; and

about 0.7 to about 0.001 percent by weight of V_2O_5,

and the basic substance B comprises the following components:

about 30 to about 48 percent by weight of Cr_2O_3;

about 12 to about 30 percent by weight of Fe_2O_3;

about 10 to about 30 percent by weight of Al_2O_3;

about 10 to about 25 percent by weight of MgO; and

about 1 to about 5 percent by weight of SiO_2.

4,695,560

CATALYST FOR THE SELECTIVE HYDROGENATION OF DIOLEFINIC HYDROCARBONS

Mark J. Gattuso, Palatine, and Daniel L. Ellig, Des Plaines, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 782,790, Oct. 1, 1985, abandoned. This application Dec. 22, 1986, Ser. No. 945,139

Int. Cl.[4] B01J *21/04, 27/043*

U.S. Cl. 502—222 9 Claims

1. A catalyst for the selective hydrogenation of diolefinic hydrocarbons to monoolefinic hydrocarbons, which consists essentially of an alumina support material, about 0.05 to 1.5 wt. % sulfur, and about 1.0 to 25.0 wt. % nickel, where the alumina support material is characterized by having a total pore volume greater than 1.4 but less than 2.5 cc/g, a surface area greater than 150 m^2/g, with less than 25 percent of the total pore volume being provided by pores having pore diameters of less than 150 angstroms and with over 60 percent of the pore volume being provided by pores having pore diameters greater than 600 angstroms.

4,695,561

CHEMICALLY IMPREGNATED IN SITU REGENERATION OF THE EFFICIENCY OF ACTIVATED CARBON FILTERS FOR TRAPPING RADIOACTIVE IODINE

Victor R. Deitz, 3310 Winnett Rd., Chevy Chase, Md. 20815

Continuation-in-part of Ser. No. 506,790, Jun. 22, 1983, Pat. No. 4,518,562. This application Mar. 7, 1985, Ser. No. 709,389

Int. Cl.[4] B01J *20/22*

U.S. Cl. 502—401 **2 Claims**

1. An activated charcoal filter impregnated with a compound selected from Quinuclidine.CH_3I; Triethylenediamine. $2CH_3I$; and Hexamethylenetetramine.CH_3I for efficiently removing radioactive iodine from an air flow directed through said impregnated filter.

4,695,562

SYNTHETIC PEPTIDE COMPOUNDS

Edwin H. Beachey, Memphis, Tenn.; Andre Tartar, Vitry-en-Artois, France; Helene Gras-Masse, Hem, France; Michel Jolivet, Issy-les-Moulineaux, France; Francoise Audibert, Neuilly S/Seine, France, and Louis Chedid, Paris, France, assignors to Univ. of Tennessee Research Corp., Knoxville, Tenn.

Continuation of Ser. No. 597,272, Apr. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 402,355, Jul. 27, 1982, Pat. No. 4,454,121. This application Dec. 11, 1985, Ser. No. 808,214

The portion of the term of this patent subsequent to Jun. 12, 2001, has been disclaimed.

Int. Cl.[4] A61K *37/02;* **C07K** *7/06, 7/08, 7/10*

U.S. Cl. 514—13 **20 Claims**

1. A synthetic polypeptide which comprises the amino acid sequence

X-Ala-Asp-Leu-Glu-Lys-Ala-Leu-Glu-Gly-Y

wherein X is Lys-, Arg-Lys-, Ala-Ala-Leu-Ala-Ala-Arg-Lys-, Leu-Glu-Ala-Glu-Lys-Ala-Ala-Leu-Ala-Ala-Arg-Lys-, Ala-Lys-Ile-Lys-Thr-Leu-Glu-Ala-Glu-Lys-Ala-Ala-Leu-Ala-Ala-Arg-Lys-, Asp-Ser-Ala-Lys-Ile-Lys-Thr-Leu-Glu-Ala-Glu-Lys-Ala-Ala-Leu-Ala-Ala-Arg-Lys-, or Asn-Phe-Ser-Thr-Ala-Asp-Ser-Ala-Lys-Ile-Lys-Thr-Leu-Glu-Ala-Glu-Lys-Ala-Ala-Leu-Ala-Ala-Arg-Lys-; and Y is -Ala, -Ala-Met, or -Ala-Met-Cys.

4,695,563

ARTHROPODICIDAL PHOSPHORUS-CONTAINING HETEROCYCLES

Bernd-Wieland Krüger, Wuppertal; Wolfgang Behrenz, Overath; Benedikt Becker, Mettmann; Bernhard Homeyer, Leverkusen, and Wilhelm Stendel, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

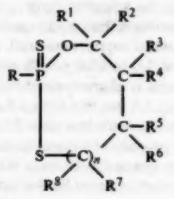
Filed Jun. 3, 1986, Ser. No. 870,043

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520388; Nov. 2, 1985, 3538894

Int. Cl.[4] A01N *51/36;* **C07F** *9/21*

U.S. Cl. 514—105 **10 Claims**

1. A phosphorus-containing heterocycle of the formula



in which

R represents amino, C_1–C_6-alkylamino, methyl-(C_1–C_6-alkyl)-amino or optionally halogen-substituted C_1–C_6-alkylthio, C_1–C_6-alkoxy or C_1–C_6-alkylthio,

R^1 to R^8 are identical or different and represent hydrogen, halogen, NO_2, C_1–C_6-alkyl which can be halogen-substituted, C_2–C_8-alkenyl, di-(C_1–C_4-alkyl)-amino, C_1–C_4-alkoxy-C_1–C_4-alkyl, C_1-alkylthio-C_1–C_4-alkyl, benzyl or phenyl,

or in which

two of the radicals R^1 to R^8, together with the carbon atom or carbon atoms to which they are bonded, form a C_5–C_7-cycloalkyl or cycloalkenyl ring which can be substituted by methyl or ethyl and which can be bridged by a methylene or ethylene group to form a bicyclic ring, and

n represents zero or one.

9. A method of combatting arthropods which comprises applying to such arthropods or to an arthropod habitat an arthropodicidally effective amount of a compound according to claim 1 in admixture with a diluent.

4,695,564

INSECTICIDAL COMPOSITIONS COMPRISING A SYNERGISTIC MIXTURE OF TERBUFOS OR PHORATE AND A PYRETHROID

Paul J. Walgenbach, Hamilton, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 709,617, Mar. 8, 1985, abandoned. This application Feb. 25, 1986, Ser. No. 831,605

Int. Cl.[4] A01N *37/34, 57/00*

U.S. Cl. 514—127 **7 Claims**

1. An insecticidal composition comprising a synergistic mixture of 10 to 40 parts by weight of 0,0-diethyl S-[(ethylthio)methyl]phosphorodithioate or S[[(1,1-dimethylethyl)thio]-methyl] 0,0-diethylphosphorodithioate and 1 part by weight of a pyrethroid selected from the group consisting of (±)-α-cyano-m-phenoxybenzyl (±)-2-[p-(difluoromethoxy) phenyl]-3-methylbutyrate, cyano-(3-phenoxyphenyl)-methyl-4-chloro-α-(1-methylethyl) benzeneacetate and (±)-α-cyano-3-phenoxbenzyl-(±)-cis, trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylate.

4,695,565

ANTIBACTERIAL 7β-HETEROCYCLIC-CEPHEM

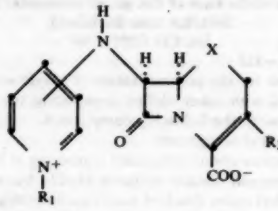
John Hannah, Matawan, and Burton G. Christensen, Cliffside, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 657,711, Oct. 4, 1984, abandoned. This application Dec. 7, 1984, Ser. No. 679,413

Int. Cl.[4] C07D *501/18;* **A61K** *31/545*

U.S. Cl. 514—206 **4 Claims**

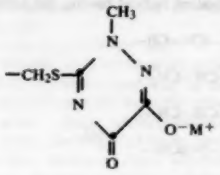
1. A compound having the structural formula:



wherein:

R_1 is a hydrogen, lower alkyl, phenyl(lower)alkyl,

R_3 is a 5- or 6-membered heterocyclic thio methyl substituent selected from:



wherein M is an alkali or alkaline earth metallic cation and pharmaceutically accepted salts thereof; and
X is sulfur.

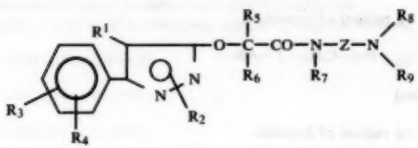
4,695,566

3-AMINOCARBONYLMETHOXY-5-PHENYLPYRAZOLE COMPOUNDS, ANTIARRYTHMIC COMPOSITIONS CONTAINING THEM, AND INTERMEDIATES IN THEIR PREPARATION

Henning Heinemann; Wolfgang Kehrbach; Uwe Schoen; Gerd Buschmann, all of Hanover, and Ulrich Kuhl, Gehrden, all of Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany

Filed Jul. 2, 1985, Ser. No. 751,045
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1984, 3424586
Int. Cl.[4] A61K *31/415, 31/535;* C07D *231/20, 405/12*
U.S. Cl. 514—234 16 Claims

1. A 3-aminocarbonylmethoxy-5-phenylpyrazole compound corresponding to the Formula I



wherein
R_1 is hydrogen or lower alkyl,
R_2 is in position 1 or 2 on the pyrazole ring and is hydrogen or lower alkyl,
R_3 is hydrogen, halogen, lower alkyl or lower alkoxy and
R_4 is hydrogen, hydrogen, lower alkyl, lower alkoxy or if R_3 is hydrogen, R_4 may also be trifluoromethyl, nitro or hydroxy or
R_3 and R_4 are linked to adjacent carbon atoms and together represent an alkylene dioxy group with 1 or 2 carbon atoms,
R_5 is hydrogen or lower alkyl and
R_6 is hydrogen or methyl or
R_5 and R_6 together from an alkylene chain with 3 to 5 carbon atoms,
R_7 is hydrogen or lower alkyl,
Z is an alkylene chain with 2 to 5 carbon atoms or the 2-hydroxypropylene chain,
R_8 is hydrogen or lower alkyl and
R_9 is hydrogen or lower alkyl or
R_8 and R_9 together with the nitrogen atom to which they are linked represent a heterocyclic group corresponding to the Formula a:

wherein A is an alkylene chain with 4 or 5 carbon atoms which chain may be substituted by 1 or 2 methyl groups, or A is the $—C_2H_4—O—C_2H_4—$ chain, or if Z is an alkylene chain, then
R_8 may be hydrogen or lower alkyl and
R_9 may be an alkylene chain, which together with the nitrogen atom to which it is linked and the carbon atom of the alkylene chain Z which is adjacent to this nitrogen atom, forms a 5- or 6-membered heterocycle, or a pharmaceutically acceptable acid addition salt thereof.

14. An antianythmic pharmaceutical composition containing an antianythmic effective quantity of a 3-aminocarbonylmethoxy-5-phenylpyrazole compound according to claim 1 and at least one additional substance selected from the group consisting of conventional pharmaceutical adjuvants and carriers.

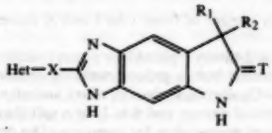
4,695,567

PYRROLOBENZIMIDAZOLES, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND METHOD OF USING THEM TO TREAT CERTAIN HEART AND CIRCULATORY DISEASES

Alfred Mertens, Schriesheim; Jens-Peter Hölck; Herbert Berger, both of Mannheim; Bernd Müller-Beckmann, Grünstadt; Klaus Strein, Hemsbach, and Egon Roesch, Mannheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,259
Claims priority, application Fed. Rep. of Germany, Jan. 18, 1985, 3501497
Int. Cl.[4] A61K *31/50, 31/505;* C07D *403/06, 487/04*
U.S. Cl. 514—253 18 Claims

1. A pyrrolobenzimidazole or tautomer thereof, of the formula:



wherein
R_1 is hydrogen, C_1–C_6 alkyl, C_2—C_6 alkenyl or C_3–C_7cycloalkyl;
R_2 is hydrogen, cyano, C_1-C_6 alkyl, C_2–C_6 alkenyl, or a carbonyl group substituted by hydroxyl, C_1–C_6 alkyl, C_1–C_6 alkoxy, amino, C_1–C_6 alkylamino, C_2–C_{12} dialkylamino or hydrazino, or
R_2 and R_1 together with the carbon to which they are attached form a C_3–C_8 spirocycloalkyl ring, or R_1 and R_2 together form C_3–C_7 alkylidene or C_3–C_7 cycloalkylidene,
X is a valency bond, C_1–C_4 alkylene or vinylene and
T is oxygen or sulphur;
and Het is furanyl, thienyl, pyrrolyl, pyrazolyl, imidazolyl, oxazolyl, thiazolyl, triazolyl, oxadiazolyl, thiadiazolyl, pyrazinyl, pyrimidinyl or pyridazinyl wherein the heterocyclic five- and six-membered rings are unsubstituted or substituted by one or more C_1–C_6 alkyl, C_1–C_6 alkoxy, C_1–C_6 alkylthio, hydroxyl, oxo, nitro, amino, halo, carboxyl, C_2–C_7 alkoxycarbonyl, aminocarbonyl or cyano groups; or a physiologically acceptable salt thereof with an inorganic or organic acid.

17. A method of treating heart or circulatory diseases which respond to a change of blood pressure, an increase in cardiac output and/or a change in microcirculation comprising administering an effective amount for treating said heart or circulatory diseases, of the pyrrobenzimidazole of claim 1.

4,695,568

THIENO[2,3-D]PYRIMIDINE DERIVATIVES AND SALTS THEREOF

Kunihiro Ninomiya; Issei Nitta, both of Machida; Akihiro Tobe, Yokohama; Mitsuo Egawa, and Ryoji Kikumoto, both of Machida, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

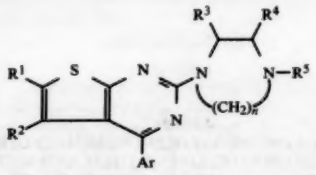
Filed Dec. 24, 1984, Ser. No. 685,768

Claims priority, application Japan, Jan. 5, 1984, 59-479

Int. Cl.[4] A61K *31/38;* **C07D** *239/00*

U.S. Cl. 514—258 **18 Claims**

1. A thieno[2,3-d]pyrimidine compound represented by the formula (I):

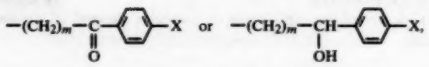


(I)

wherein R^1 and R^2 independently represent hydrogen, halogen or an alkyl group having 1–6 carbon atoms; or R^1 and R^2 together with the carbon atoms to which they are attached may form a cycloalkylene group having 5 to 6 carbon atoms; R^3 and R^4 independently represent hydrogen or an alkyl group having 1–6 carbon atoms; R^5 represents a member selected from the group consisting of:

(1) hydrogen or alkyl of 1–6 carbon atoms, and

(2)



in which m is an integer of from 1 to 3 and X represents halogen;

Ar represents 2- or 3-thienyl, phenyl or phenyl substituted by a member selected from a group consisting of halogen, C_1–C_6 alkyl, C_1–C_6 alkoxy, hydroxyl, nitro, amino, cyano and alkyl-substituted amino; and n is 2; or a salt thereof.

17. A pharmaceutical preparation for improving the depressive conditions and/or dysfunctions of the brain in a unit dosage form, which comprises an effective dosage of the thieno[2,3-d]pyrimidine compound according to claim **1** as an active ingredient.

4,695,569

BICYCLIC HETEROCYCLYL CONTAINING N-(BICYCLIC HETEROCYCLYL)-4-PIPERIDINAMINES

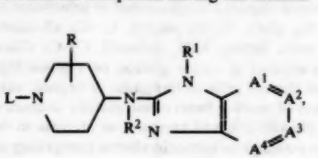
Frans E. Janssens, Bonheiden; Joseph L. G. Torremans, Beerse; Jozef E. Hens, Nijlen, and Theophilus T. J. M. Van Offenwert, Vosselaar, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 556,742, Nov. 30, 1983, abandoned. This application Oct. 12, 1987, Ser. No. 660,608

Int. Cl.[4] A61K *31/415;* **C07D** *239/00*

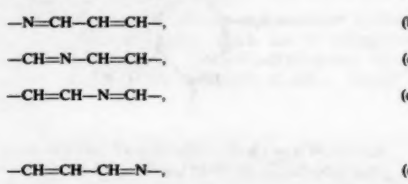
U.S. Cl. 514—258 **15 Claims**

1. A chemical compound having the formula



(I)

a pharmaceutically acceptable acid addition salt or a possible stereochemically isomeric form thereof, wherein: $A^1{=}A^2{-}A^3{=}A^4$ is a bivalent radical having the formula



(a)

(b)

(c)

(d)

or

(e)

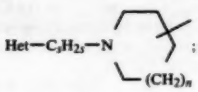
wherein one or two hydrogen atoms in said radicals (a)-(e) may, each independently from each other, be replaced by halo, lower alkyl, lower alkyloxy, trifluoromethyl or hydroxy;

R is a member selected from the group consisting of hydrogen and lower alkyl;

R^1 is a member selected from the group consisting of hydrogen, alkyl, cycloalkyl, Ar^1 and lower alkyl substituted with one or two Ar^1 radicals;

R^2 is a member selected from the group consisting of hydrogen, lower alkyl, cycloalkyl, (lower alkyl)—CO—, lower alkyl—O—(CO)— and Ar^2—lower alkyl;

L is a member selected from the group consisting of a radical of formula



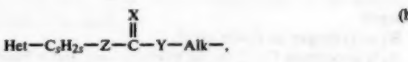
(f)

a radical of formula

(g)

and

a radical of formula



(h)

wherein

n is 0 or the integer 1 or 2;

s is 0 or an integer of from 1 to 6 inclusive;

Alk is lower alkanediyl;

Y is O, S, NR^3 or a direct bond;

X is O, S, CH—NO_2 or NR^4;

Z is O, S, NR^5 or a direct bond; and

Het is an optionally substituted six-membered ring having two ring nitrogens which are separated by a single ring carbon and having three additional ring carbons, and being condensed with an optionally substituted five- or six-membered ring through said single ring carbon and one of said nitrogens, the remainder of the ring being carbon optionally interrupted by a sulfur or nitrogen, provided that:

(ii) when L is a radical either of formula (f), or of formula (g) wherein Y is other than a direct bond, or of formula (h) wherein Z is other than a direct bond, wherein in said radicals (f), (g) or (h) Het is connected to C_sH_{2s} on a nitrogen atom then s is not 0;

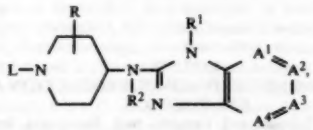
said R^3 being hydrogen, lower alkyl, (Ar^2)lower alkyl, 2-lower alkyloxy-1,2-dioxoethyl or a radical of formula —C(=X)—R^6, R^6 being hydrogen, lower alkyl, Ar^2, Ar^2—lower alkyl, lower alkyloxy, Ar^2—lower alkyloxy, mono- or di(lower alkyl)amino, Ar^2—amino, Ar^2—lower alkylamino or Ar^2—lower alkyl(lower alkyl)amino;

said R^4 being hydrogen, lower alkyl, cyano, nitro, Ar^2—sulfonyl, lower alkylsulfonyl, lower alkylcarbonyl or Ar^2—carbonyl; and

said R^5 being hydrogen or lower alkyl;

wherein Ar^1 is a member selected from the group consisting of phenyl, being optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, carboxyl, lower alkyloxycarbonyl and lower alkyl—CO—; thienyl, halothienyl; furanyl; lower alkyl substituted furanyl; pyridinyl; pyrazinyl; thiazolyl and imidazolyl optionally substituted by lower alkyl; and wherein Ar^2 is a member selected from the group consisting of phenyl being optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)-amino, carboxyl, lower alkyloxycarbonyl and (lower alkyl)—CO.

7. A method of treating allergic diseases in warm-blooded animals suffering from same which method comprises the systemic administration to warm-blooded animals of an effective anti-allergic amount of a compound having the formula



(I)

a pharmaceutically acceptable acid addition salt or a possible stereochemically isomeric form thereof, wherein:

$A^1{=}A^2{-}A^3{=}A^4$ is a bivalent radical having the formula

$$-CH{=}CH{-}CH{=}CH-, \quad (a)$$

$$-N{=}CH{-}CH{=}CH-, \quad (b)$$

$$-CH{=}N{-}CH{=}CH-, \quad (c)$$

$$-CH{=}CH{-}N{=}CH-, \quad (d)$$

or

$$-CH{=}CH{-}CH{=}N-, \quad (e)$$

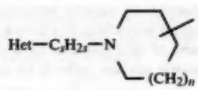
wherein one or two hydrogen atoms in said radicals (a)-(e) may, each independently from each other, be replaced by halo, lower alkyl, lower alkyloxy, trifluoromethyl or hydroxy;

R is a member selected from the group consisting of hydrogen and lower alkyl;

R^1 is a member selected from the group consisting of hydrogen, alkyl, cycloalkyl, Ar^1 and lower alkyl substituted with one or two Ar^1 radicals;

R^2 is a member selected from the group consisting of hydrogen, lower alkyl, cycloalkyl, (lower alkyl)—CO—, lower alkyl—O—(CO)— and Ar^2—lower alkyl;

L is a member selected from the group consisting of a radical of formula



(f)

a radical of formula

$$Het{-}C_sH_{2s}{-}Y{-}Alk-; \quad (g)$$

and

a radical of formula

(h)

wherein n is 0 or the integer 1 or 2;

s is 0 or an integer of from 1 to 6 inclusive;

Alk is lower alkanediyl;

Y is O, S, NR^3 or a direct bond;

X is O, S, CH—NO_2 or NR^4;

Z is O, S, NR^5 or a direct bond; and

Het is an optionally substituted six-membered ring having two ring nitrogens which are separated by a single ring carbon and having three additional ring carbons, and being condensed with an optionally substituted five- or six-membered ring through said single ring carbon and one of said nitrogens, the remainder of the ring being carbon optionally interrupted by a sulfur or nitrogen, provided that:

(ii) when L is a radical either of formula (f), or of formula (g) wherein Y is other than a direct bond, or of formula (h) wherein Z is other than a direct bond, wherein in said radicals (f), (g) or (h) Het is connected to C_sH_{2s} on a nitrogen atom then s is not 0;

said R^3 being hydrogen, lower alkyl, (Ar^2)lower alkyl, 2-lower alkyloxy-1,2-dioxoethyl or a radical of formula —C(=X)—R^6, R^6 being hydrogen, lower alkyl, Ar^2, Ar^2—lower alkyl, lower alkyloxy, Ar^2—lower alkyloxy, mono- or di(lower alkyl)amino, Ar^2—amino, Ar^2—lower alkylamino or Ar^2—lower alkyl(lower alkyl)amino;

said R^4 being hydrogen, lower alkyl, cyano, nitro, Ar^2—sulfonyl, lower alkylsulfonyl, lower alkylcarbonyl or Ar^2—carbonyl; and

said R^5 being hyrogen or lower alkyl;

wherein Ar^1 is a member selected from the group consisting of phenyl, being optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, carboxyl, lower alkyloxycarbonyl and lower alkyl—CO—; thienyl, halothienyl; furanyl; lower alkyl substituted furanyl; pyridinyl; pyrazinyl; thiazolyl and imidazolyl optionally substituted by lower alkyl; and wherein Ar^2 is a member selected from the group consisting of phenyl being optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)-amino, carboxyl, lower alkyloxycarbonyl and (lower alkyl)—CO.

4,695,570

ANTIVIRAL COMPOUND USE

Thomas A. Krenitsky, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 434,384, Oct. 14, 1982, Pat. No. 4,544,634. This application Mar. 15, 1985, Ser. No. 712,160

The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.

Int. Cl.[4] A61K *31/52*

U.S. Cl. 514—261 **9 Claims**

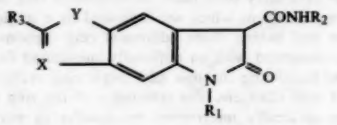
1. A method of delivering acyclovir in an effective antiviral treatment amount to a human having a viral infection which comprises orally administering to said human an amount of 6-deoxyacyclovir sufficient to produce an effective antiviral treatment amount of acyclovir in said human.

4,695,571
TRICYCLIC OXINDOLE ANTIINFLAMMATORY AGENTS

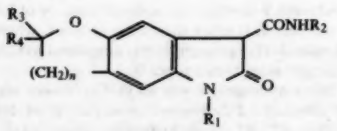
Lawrence S. Melvin, Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.

PCT No. PCT/US84/01371, § 371 Date Apr. 2, 1986, § 102(e) Date Apr. 2, 1986, PCT Pub. No. WO86/01510, PCT Pub. Date Mar. 13, 1986
PCT Filed Aug. 24, 1984, Ser. No. 867,185
Int. Cl.[4] A61K *31/41*; C07D *498/04*, *491/048*, *515/04*
U.S. Cl. 514—275 25 Claims

1. Compounds of the formulae



and

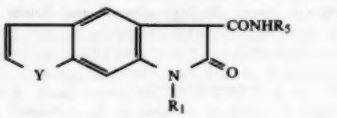


and the pharmaceutically acceptable base salts thereof, wherein Y is selected from the group consisting of oxygen and sulfur; X is selected from the group consisting of

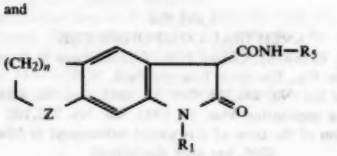
N, CH and C(CH$_3$);

R_1 is selected from the group consisting of alkyl containing one to three carbon atoms and phenyl; R_2 is selected from the group consisting of phenyl, mono-substituted phenyl wherein said substituent is selected from the group consisting of fluoro, chloro, trifluoromethyl, methylthio, methoxy, acetyl, ethoxycarbonyl and methylsulfinyl, disubstituted phenyl wherein said substituents are each selected from fluoro and methoxy, and heterocyclic and mono- and dimethyl substituted heterocyclic wherein said heterocyclic is selected from the group consisting of 2-thiazolyl, 2-oxazolyl, 5-isothiazolyl, 3-isoxazolyl, benzothiazolyl, 2-thiazolinyl, 2-thiadiazolyl, 2-pyrimidinyl and pyridyl; R_3 and R_4 are each selected from the group consisting of hydrogen and methyl; and n is an integer of 1 or 2.

14. Compounds of the formulae

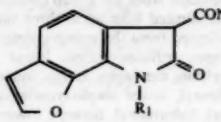


and



and the pharmaceutically acceptable base salts thereof, wherein Y is selected from the group consisting of oxygen and sulfur; R_1 is selected from the group consisting of alkyl containing from one to three carbon atoms and phenyl; Z is selected from the group consisting of oxygen and methylene; n is an integer of 1 or 2; and R_5 is selected from the group consisting of phenyl, fluorophenyl, difluorophenyl, chlorophenyl, pyridyl, 2-thiazolyl and monomethyl-2-thiazolyl.

22. The compound of the formula



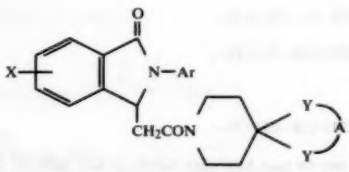
and the pharmaceutically acceptable base salt thereof, wherein R_1 is selected from the group consisting of alkyl containing from one to three carbon atoms and phenyl; and R_6 is selected from the group consisting of fluorophenyl, difluorophenyl, pyridyl, 2-thiazolyl and 5-methyl-2-thiazolyl.

4,695,572
ISOINDOLINONE DERIVATIVES, PRODUCTION AND USE THEREOF

Giichi Goto, Toyono, and Yoshiaki Saji, Kawanishi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 10, 1985, Ser. No. 774,470
Claims priority, application Japan, Sep. 14, 1984, 59-193073
Int. Cl.[4] A61K *31/40*; C07D *209/46*
U.S. Cl. 514—278 14 Claims

1. A compound of the formula



wherein X is hydrogen, halogen or nitro; Ar is phenyl, naphthyridinyl, or substituted phenyl or naphthyridinyl having one or two substituents of the class consisting of halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, nitro, amino, methylenedioxy, phenoxy, benzyloxy, C_{2-5} alkanoyloxy, α- or ω-hydroxy-C_{1-4} alkyl, benzoyl, amido, cyano, trifluoromethyl, C_{1-4} alkylthio, C_{2-5} alkanoyloxy-C_{1-3} alkyl, C_{2-5} alkanoylamino and C_{1-4} alkoxycarbonyl; Y is oxygen or sulfur; and A is a C_{2-4} alkylene chain or a C_{2-4} alkylene chain having one or more C_{1-4} alkyl side chains; or a physiologically acceptable acid addition salt thereof.

12. A pharmaceutical composition suitable for prevention or treatment of psychosomatic diseases or anxiety neuroses that contains an amount of a compound according to claim 1 effective for prevention or treatment of said diseases or neuroses and a pharmaceutically acceptable carrier, vehicle or diluent therefor.

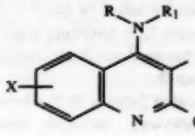
14. A method for prevention or treatment of psychosomatic diseases or anxiety neuroses in a mammal that comprises administering to said mammal an amount of a pharmaceutical composition according to claim 12 that is effective for prevention or treatment of said diseases or neuroses.

4,695,573
9-AMINO-1,2,3,4-TETRAHYDROACRIDIN-1-OL AND RELATED COMPOUNDS

Gregory M. Shutske, Somerset, N.J., and Frank A. Pierrat, Coventry, R.I., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 664,730, Oct. 25, 1984, Pat. No. 4,631,286. This application Oct. 1, 1985, Ser. No. 781,155
The portion of the term of this patent subsequent to Mar. 6, 2001, has been disclaimed.
Int. Cl.[4] A61K *31/47;* C07D *219/10*
U.S. Cl. 514—290 89 Claims

1. A compound having the formula



wherein n is 1, 2 or 3; X is hydrogen, loweralkyl, loweralkoxy, halogen, hydroxy, nitro, trifluoromethyl, $NHCOR_2$ where R_2 is loweralkyl, or NR_3R_4 where R_3 and R_4 are independently hydrogen or loweralkyl; R is hydrogen or loweralkyl; R_1 is hydrogen, loweralkyl, diloweralkylaminoloweralkyl, arylloweralkyl, diarylloweralkyl, furylloweralkyl, thienylloweralkyl, oxygen-bridged arylloweralkyl, oxygen-bridged diarylloweralkyl, oxygen-bridged furylloweralkyl, oxygen-bridged thienylloweralkyl; Y is C=O or CR_5OH where R_5 is hydrogen or loweralkyl; Z is CH_2 or $C{=}CR_6R_7$ where R_6 and R_7 are independently hydrogen or loweralkyl; an optical antipode thereof, or a pharmaceutically acceptable acid addition salt thereof.

83. The compound as defined in claim 1, which is 9-amino-1,2,3,4-tetrahydro-cyclopenta[b]quinolin-1-ol.

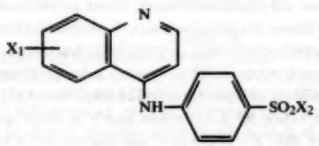
87. A method of treating a patient in need of memory enhancement, wherein an effective memory enhancing amount of a compound defined in claim 1 is administered to the patient.

4,695,574
4-QUINOLINYLAMINO-N-[PYRROLIDINYL OR PIPERDINYL)ALKYL]-BENZENESULPHONAMIDES

John T. A. Boyle, Cookham, and Richard S. Todd, Near Slough, both of England, assignors to American Home Products Corporation, New York, N.Y.

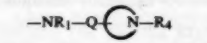
Filed Dec. 17, 1985, Ser. No. 809,996
Claims priority, application United Kingdom, Dec. 19, 1984, 8432091
Int. Cl.[4] C07D *215/44;* A61K *31/47*
U.S. Cl. 514—313 11 Claims

1. A compound having the formula



(I)

or a pharmaceutically acceptable salt thereof, wherein X_1 is selected from halogen and trifluoromethyl and X_2 represents a group having the formula



(II)

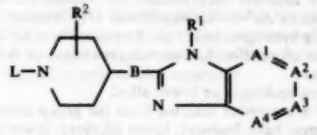
where Q is lower alkylene attached to a ring carbon atom of the ring illustrated in formula II; R_1 is selected from hydrogen and lower alkyl; and R_4 is lower alkyl and the ring illustrated in formula II is a piperidine or a pyrrolidine ring which is unsubstituted or substituted on one or more carbon ring members by a lower alkyl group.

4,695,575
4-[(BICYCLE HETEROCYCLYL)-METHYL AND -HETERO}-PIPERIDINES

Frans E. Janssens, Bonheiden; Ludo E. J. Kennis, Turnhout; Jozef F. Hens, Nijlen; Joseph L. G. Torremans, Beerse, and Gaston S. M. Diels, Ravels, all of Belgium, assignors to Janssen Pharmaceutica, N.V., Beerse, Belgium

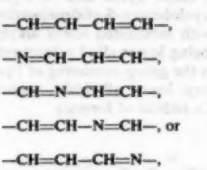
Continuation-in-part of Ser. No. 671,135, Nov. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 569,369, Jan. 9, 1984, abandoned. This application Jun. 24, 1985, Ser. No. 747,754
Int. Cl.[4] A61K *31/445;* C07D *401/12*
U.S. Cl. 514—322 12 Claims

1. A chemical compound having the formula



(I)

a pharmaceutically acceptable acid addition salt or a possible stereochemically isomeric form thereof, wherein: $A^1{=}A^2{-}A^3{=}A^4$ is a bivalent radical having the formula



(a-1)

(a-2)

(a-3)

(a-4)

(a-5)

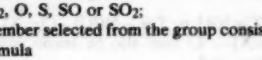
wherein one or two hydrogen atoms in said radicals (a-1)–(a-5) may, each independently from each other, be replaced by halo, lower alkyl, lower alkyloxy, trifluoromethyl or hydroxy;

R^1 is a member selected from the group consisting of hydrogen, alkyl, cycloalkyl, Ar^1 and lower alkyl substituted with one or two Ar^1 radicals;

R^2 is a member selected from the group consisting of hydrogen and lower alkyl;

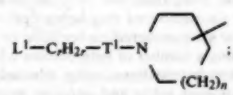
B is CH_2, O, S, SO or SO_2;

L is a member selected from the group consisting of a radical of formula



(b-1)

a radical of formula



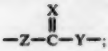
(b-2)

wherein one or two hydrogen atoms in the bivalent radical $-C_rH_{2r}-$ may, each independently from each other, be replaced by halo, hydroxy, mercapto, isothiocyanato, isocyanato, lower alkyloxy, lower alkylthio, Ar^1, Ar^1O—, Ar^1S—, Ar^1SO_2—, or NR^3R^5; and

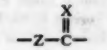
n is 0 or the integer 1 or 2;

r and s are, independently from each other, 0 or an integer of from 1 to 6 inclusive;

T is —Y— or



T^1 is



or a direct bond;

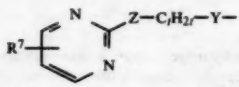
said Y being O, S, NR^3 or a direct bond; X being O, S, $CH—NO_2$ or NR^4; Z being O, S, NR^5 or a direct bond; and

said R^3 being hydrogen, lower alkyl, (Ar^2)lower alkyl, 2-lower alkyloxy-1,2-dioxoethyl or a radical of formula $—C(=X)—R^6$, R^6 being hydrogen, lower alkyl, Ar^2, Ar^2-lower alkyl, lower alkyloxy, Ar^2-lower alkyloxy, mono- or di(lower alkyl)amino, Ar^2-amino, Ar^2-lower alkylamino or Ar^2-lower alkyl(lower alkyl)amino;

said R^4 being hydrogen, lower alkyl, cyano, nitro, Ar^2-sulfonyl, lower alkylsulfonyl, lower alkylcarbonyl or Ar^2-carbonyl; and

said R^5 being hydrogen or lower alkyl;

wherein L^1 is a member selected from the group consisting of hydrogen; halo; hydroxy; lower alkyloxy; lower alkylthio; cyano; mercapto; isocyanato; isothiocyanato; Ar^1; Ar^1-carbonyl; Ar^1-sulfonyl; lower alkylsulfonyl; cycloalkyl being optionally substituted with up to two substituents each independently selected from the group consisting of lower alkyl, cyano and Ar^2; [10,11-dihydro-5H-dibenzo[a,d]cycloheptene-5-ylidene]methyl; Het; and furan substituted with substituted lower alkyl; said substituted lower alkyl being lower alkyl substituted with a member selected from the group consisting of hydroxy, mercapto, lower alkyloxy, lower alkylthio, aminolower alkylthio, Ar^2-oxy and a radical of formula



(c)

wherein: t is 0 or an integer of from 1 to 6 inclusive; and R^7 is hydrogen or lower alkyl; provided that: when in said radical of formula (c) t is 0, then Z or Y is a direct bond; and

where r is 0, L^1 may also be lower alkenyl, Ar^1-lower alkenyl or lower alkyl substituted with two lower alkyloxy radicals; and

where r is 0 and T is NR^3, or T is $—N(R^5)—C(=X)—Y$ or T^1 is $—N(R^5)—C(=X)—$, L^1 may also be amino, lower alkylamino or Ar^1-amino; and

where r is 0, and T is $—N(R^5)—C(=X)—Y$ or T^1 is $—N(R^5)—C(=X)—$, L^1 may also be nitro; said Het being a five- or six-membered heterocyclic ring containing a number of heteroatoms which varies of from 1 to 4, said heteroatoms being selected from the group consisting of oxygen, sulfur and nitrogen, provided that no more than two oxygens or sulfurs are present, said five or six-membered ring being optionally condensed with a five- or six-membered carbocyclic or heterocyclic ring also containing a number of heteroatoms which varies from 1 to 4, the latter heteroatoms being selected from the group consisting of oxygen, sulfur and nitrogen, provided that no more than 2 oxygens or sulfurs are present, and wherein said Het being a bicyclic ring system may optionally be substituted with up to 6 substituents, or said Het being a monocyclic ring system may optionally be substituted with up to 3 substituents, said substituents of Het being selected from the group consisting of a bivalent radical of formula =X, said =X independently having the same meaning of the previously defined X; halo; isocyanato; isothiocyanato; nitro, cyano, trifluoromethyl; a radical of formula R—Y—, wherein R is hydrogen, Ar^1 or lower alkyl being optionally substituted with Ar^1, lower alkyloxy, Ar^1O, hydroxy, lower alkyloxycarbonyl and Y independently has the same meaning of the previously defined Y; and a radical R—Z—C(=X)—Y—, wherein R is as defined hereinabove and Z, X and Y independently have the same meanings of the previously defined Z, X and Y; provided that (i) when in the radical R—Y— R is hydrogen, then Y is other than a direct bond, or (ii) when in the radical R—Z—C(=X-)—Y—R is hydrogen and Y is NR^3, O or S, then Z is other than O or S; provided that:

(i) when L is a radical of formula (b-1) wherein L^1 is hydrogen and wherein T is —Z—C(=X)—Y— wherein y is other then a direct bond and Z and X are each independently O or S, then r is not 0; or when L is a radical of formula (b-2) wherein L^1 is hydrogen and wherein T^1 is —Z—C(=X)— wherein Z and X are each independently O or S, then r is not 0;

(ii) when L is a radical of formula (b-1) wherein L^1 is halo, hydroxy, lower alkyloxy, mercapto, lower alkylthio, isocyanato, isothiocyanato or Het connected to C_rH_{2r} on a nitrogen atom, and wherein r is 0, then T is a direct bond or a radical —C(=X)—Y—; or when L is a radical or formula (b-2) wherein L^1 is halo, hydroxy, lower alkyloxy, mercapto, lower alkylthio, isocyanato, isothiocyanato or Het connected to C_rH_{2r} on a nitrogen atom, and wherein r is 0, then T^1 is a radical —C(=X)—;

(iii) when L is a radical of formula (b-1) wherein T is Y, said Y being other than a direct bond, or when T is —Z—C(=X)—Y—, wherein Y is other than a direct bond, then s is not 0;

wherein Ar^1 is a member selected from the group consisting of phenyl, substituted phenyl, naphthalenyl, thienyl, halothienyl, lower alkylthienyl, pyridinyl, mono- and di(lower alkyloxy)pyridinyl, pyrrolyl, lower alkylpyrrolyl, furanyl, furanyl substituted with lower alkyl, pyrazinyl, thiazolyl, imidazolyl, lower alkylimidazolyl; said substituted phenyl, being phenyl substituted with up to 3 substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, lower alkylsulfonyl, lower alkylsulfonyllower alkyl, phenyllower alkylsulfonyl, phenylsulfonyllower alkyl, a radical of formula $R^8—C_pH_{2p}—Y—$, a radical of formula $R^9—Z—C(=X)—Y—$, and a radical of formula $R^{10}SO_2Y—$; wherein p is an integer of from 1 to 6 inclusive and R^8 is a member selected from the group consisting of amino, cyano, phenyl aminocarbonyl, mono- and di(lower alkyl)aminocarbonyl, lower alkyloxycarbonyl, phenyllower alkyloxycarbonyl, 4-morpholinylcarbonyl, 1-piperidinylcarbonyl, 1-pyrrolidinylcarbonyl, and lower alkenyl; wherein R^9 is member selected from the group consisting of hydrogen, lower alkyl and Ar^2; provided that, when R^9 is hydrogen and Y is other than a direct bond, then Z is not O or S; and wherein R^{10} is lower alkyl or Ar^2;

wherein Ar^2 is a member selected from the group consisting of phenyl, substituted phenyl, thienyl and furanyl, said substituted phenyl being phenyl optionally substituted with up to three substituents each independently selected from the group consisting of halo, hydroxy, nitro, cyano, trifluoromethyl, lower alkyl, lower alkyloxy, lower alkylthio, mercapto, amino, mono- and di(lower alkyl)amino, carboxyl, lower alkyloxycarbonyl and (lower alkyl)-CO.

4,695,576

L-N--N-PROPYLPIPECOLIC ACID-2,6-XYLIDIDE

Bo T. af Ekenstam, Hjalteby, and Christer Bovin, Frolunda, both of Sweden, assignors to Astra Lake Medel Aktiebolag, Sodertalje, Sweden

Continuation-in-part of Ser. No. 629,738, Jul. 9, 1984, abandoned, which is a continuation of Ser. No. 377,104, May 11, 1982, abandoned. This application Oct. 9, 1985, Ser. No. 785,819

Int. Cl.[4] C07D *211/60;* A61K *31/445*

U.S. Cl. 514—330 6 Claims

1. A method for inducing local anesthesia comprising administration to a patient needing local anesthesia an anesthetizing amount of the substantially pure L-isomer of N-n-propylpipecolic acid-2,6-xylidide or its water soluble salts substantially devoid of the racemic and the D-isomer of N-n-propylpipecolic acid-2,6-xylidide.

3. Substantially pure L-isomer of N-n-propylpipecolic acid-2,6-xylidide, and its water soluble salts, substantially devoid of racemic and D-N-n-propylpipecolic acid-2,6-xylidide.

4,695,577

ANTI-HYPERTENSIVE AGENTS

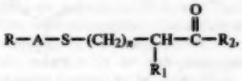
James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Coral Gables, Fla.

Filed Aug. 14, 1979, Ser. No. 64,901

Int. Cl.[4] A61K *31/40, 31/41;* C07D *207/00, 211/72*

U.S. Cl. 514—362 21 Claims

1. A new compound having the formula



wherein

R is cyclopentylcarbonyl or tert-butyloxycarbonyl;

A is L-phenylalanyl, glycyl, L-alanyl, L-tryptophyl, L-tyrosyl, L-isoleucyl, L-leucyl, L-histidyl, or L-valyl whose α-amino group is an amide linkage with R;

R_1 is hydrogen or methyl;

R_2 is L-proline, L-3,4-dehydroproline, D,L-3,4-dehydroproline, L-3-hydroxyproline, L-4-hydroxyproline or L-thiazolidine-4-carboxylic acid whose imino group is in imide linkage with the

and,

n is 0 or 1, such that when n=0, R_1 is methyl.

4,695,578

1,2,3,9-TETRAHYDRO-3-IMIDAZOL-1-YLMETHYL-4H-CARBAZOL-4-ONES, COMPOSITION CONTAINING THEM, AND METHOD OF USING THEM TO TREAT NEURONAL 5HT FUNCTION DISTURBANCES

Ian H. Coates, Hertfordshire; James A. Bell, Royston; David C. Humber, Ealing, and George B. Ewan, Gerrard's Cross, all of England, assignors to Glaxo Group Limited, London, England

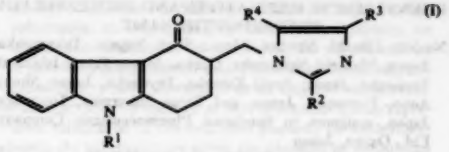
Continuation of Ser. No. 820,743, Jan. 22, 1986, abandoned, and a continuation-in-part of Ser. No. 694,790, Jan. 25, 1985, abandoned. This application Nov. 17, 1986, Ser. No. 931,032

Claims priority, application United Kingdom, Jan. 25, 1984, 8401888; Oct. 15, 1984, 8425959; Jan. 23, 1985, 8501727; Jan. 23, 1985, 8501728

Int. Cl.[4] A61K *31/415;* C07D *403/06*

U.S. Cl. 514—397 20 Claims

1. A compound of formula (I)



(I)

wherein R^1 represents a hydrogen atom or a C_{1-10} alkyl, C_{3-7} cycloalkyl, C_{3-6} alkenyl, C_{3-7} cycloalkyl-(C_{1-4})alkyl, C_{3-10} alkynyl, phenyl or phenyl-C_{1-3} alkyl group, and one of the groups represented by R^2, R^3 and R^4 is a hydrogen atom or a C_{1-6}alkyl, C_{3-7} cycloalkyl, C_{2-6} alkenyl or phenyl-(C_{1-3}) alkyl group and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C_{1-6} alkyl group; or a physiologically acceptable salt or solvate thereof.

12. A method of treating a condition caused by disturbance of "neuronal" 5HT function which comprises administering to a patient an effective amount of a compound of formula (I) as defined in claim 1 or a physiologically acceptable salt or solvate thereof to relieve said condition.

4,695,579

ANTIFUNGAL 2-AZOLYLMETHYL-3-DIFLUOROBENZYLOXY-2,3-DIHYDROFLUORO-BENZO(B) THIOPHENS

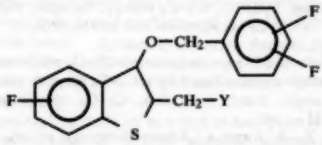
Dinanath F. Rane, Sayreville; Jagdish A. Desai, Parlin, and Russell E. Pike, Stanhope, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Dec. 21, 1984, Ser. No. 684,872

Int. Cl.[4] A61K *31/415, 31/41;* C07D *409/06*

U.S. Cl. 514—397 17 Claims

1. A compound represented by the following formula I:



I

or a pharmaceutically acceptable acid salt thereof,

wherein Y is imidazolyl, 1,2,4-triazolyl or lower alkyl and aryl substituted derivatives thereof, said aryl being a member selected from the group consisting of phenyl, halophenyl; and lower alkylphenyl;

in racemic or optically active form.

13. A method of treating susceptible fungal infections which comprises administering to a host in need of such treatment an antifungally effective amount of a compound of claim 1 or a pharmaceutical composition comprising such a compound and a pharmaceutically acceptable carrier or diluent.

4,695,580

PHENYLSERINE DERIVATIVES AND PROCESSES FOR PREPARING THE SAME

Naohito Ohashi, Newton, Mass.; Shoji Nagata, Takarazuka, Japan; Masashi Nakatsuka, Osaka, Japan; Kikuo Ishizumi, Toyonaka, Japan; Junki Katsube, Toyonaka, Japan; Shunji Aono, Toyonaka, Japan, and Teruo Sakurama, Toyonaka, Japan, assignors to Sumitomo Pharmaceuticals Company, Ltd., Osaka, Japan

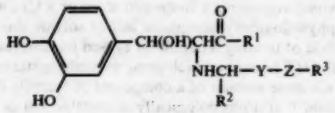
Filed Dec. 19, 1984, Ser. No. 683,430

Claims priority, application Japan, Dec. 20, 1983, 58-241601

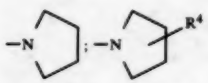
Int. Cl.[4] A61K *31/40, 31/165, 31/215;* **C07D** *209/08, 209/44, 295/18*

U.S. Cl. 514—412 **11 Claims**

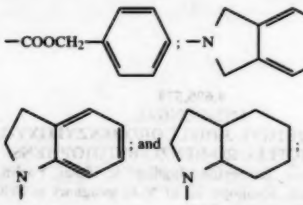
1. A phenylserine derivative of the formula:



wherein R^1 is a member selected from the group consisting of



wherein R_4 is C_1–C_4 alkyl, carboxyl, carbo(C_1–C_4)alkoxy, hydroxy(C_1–C_4)alkyl, phenyl or



wherein

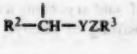
R^2 is hydrogen, a C_1–C_4 alkyl group, or phenyl;

R^3 is hydrogen; a C_1–C_4 alkyl group; a C_5–C_6 cycloalkyl group; unsubstituted pehnyl, phenyl having one or more substituents selected from the group consisting of a C_1–C_4 alkyl group, hydroxy, C_1–C_4 alkoxy, halogen, trifluoromethyl, di(C_1–C_4 alkyl)amino and methlenedioxy; naphtyl; furyl, thienyl; pyrrolyl; or indolyl;

Y is a single bond; an unsubstituted C_1–C_4 alkylene; or a C_1–C_4 alkylene substituted by a C_1–C_4 alkyl or phenyl;

Z is a single bond; oxa; thia; C_1–C_4 alkylimino; or —CONH—; or

the group Z—R^3 forms a 1,4-benzodioxyanyl group, or the group



forms a tetrahydronaphthyl group, with the proviso that when Y and Z both represent a single bond, it is the same single bond, or a pharmaceutically acceptable acid addition salt thereof.

10. A pharmaceutical composition for the treatment of allergic diseases induced by SRS-A which comprises as an essential active ingredient a therapeutically effective amount of the compound according to claim 1 in admixture with a pharmaceutically acceptable carrier or diluent.

11. A method for the treatment of allergic diseases induced by SRS-A, which comprises administering a therapeutically effective amount for the prophylaxis and treatment of allergic diseases induced by SRS-A of the compound according to claim 1 to a person suffering from said allergic diseases.

4,695,581

2-(3,5-DIALKYL-4-HYDROXYPHENYL)INDOLE DERIVATIVES

Yasushi Suzuki, Yokohama; Yukio Hasegawa, Yamato; Michitaka Sato, Kawasaki; Morinobu Saito, Kawasaki; Norio Yamamoto, Kawasaki; Katsuhiko Miyasaka, Atsugi; Takashi Mikami, Yokohama, and Katsuhiko Miyazawa, Kawasaki, all of Japan, assignors to Teikoku Hormone Mfg. Co., Ltd., Minato, Japan

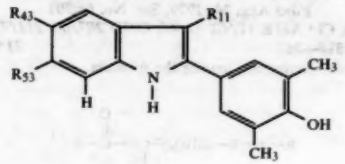
Filed Aug. 29, 1985, Ser. No. 770,773

Claims priority, application Japan, Aug. 31, 1984, 59-180656

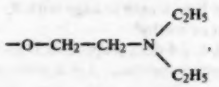
Int. Cl.[4] A61K *31/40;* **C07D** *209/12*

U.S. Cl. 514—415 **5 Claims**

1. A compound represented by the formula



Wherein R_{11} represents a methyl or ethyl group, R_{43} represents a hydrogen atom, a methyl group, a methoxy group, an n-propoxy group, an isopropoxy group, an amino group, or a group of the formula



and R_{53} represents a hydrogen atom or a methoxy group when R_{43} is a methoxy group and represents a hydrogen atom when R_{43} is other than a methoxy group, or a pharmaceutically acceptable salt thereof.

2. A pharmaceutical composition for inhibiting 5-lipoxygenase comprising a 5-lipoxygenase-inhibiting amount of a compound defined in claim 1 or its pharmaceutically acceptable salt in combination with a pharmaceutically acceptable carrier or diluent.

4,695,582

INHIBITORS OF ANGIOTENSIN CONVERTING ENZYME

James W. Ryan, and Alfred Chung, both of Miami, Fla., assignors to University of Miami, Coral Gables, Fla.

Continuation of Ser. No. 941,289, Sep. 11, 1978. This application Jan. 30, 1980, Ser. No. 116,950

The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.

Int. Cl.[4] A61K *31/40, 31/41;* **C07D** *207/00*

U.S. Cl. 514—423 **15 Claims**

1. New compounds selected from the group: N-[3-(benzoylphenylalanylthio)-2-D-methylpropanoyl]-L-proline, N-(2-benzoylphenylalanylthiopropanoyl)-L-proline and N-(3-benzoylphenylalanylthiopropanoyl)-L-proline.

4,695,583

METHOD FOR RELIEVING PAIN OR PRODUCING ANALGESIA

Emanuel Revici, New York, N.Y., assignor to Elena Avram, New York, N.Y.

Filed Apr. 28, 1986, Ser. No. 856,905
Int. Cl.[4] A61K 31/335
U.S. Cl. 514—449 16 Claims

1. A method for relieving pain or producing analgesia in a host having a painful area which comprises injecting a solution of epichlorohydrin hydrolyzed in water at the painful area in a sufficient amount to relieve pain or produce analgesia therein.

4,695,584

METHOD OF SYNTHESIZING BREVICOMIN AND USING SAME IN BEETLE CONTROL

Theodore Cohen, Pittsburgh, Pa., and James Matz, Ithaca, N.Y., assignors to University of Pittsburgh, Pittsburgh, Pa.

Division of Ser. No. 312,988, Oct. 20, 1981, Pat. No. 4,426,535.
This application Jan. 24, 1983, Ser. No. 460,405
Int. Cl.[4] A01N 43/16
U.S. Cl. 514—456 4 Claims

1. A method of interfering with normal propagation of Dendroctonus beetles including:

providing a reactive metal reducing agent in solution form,

admixing with said reducing agent an alpha-(phenylthio) ether substrate which is the Diels-Alder adduct of phenyl vinyl sulfide and methyl vinyl ketone,

effecting said admixture at about −45° C. to about −93° C., for at least about 15 minutes, adding to said reducing agent-substrate solution about 1 to 10 moles of propionaldehyde, adding an organic solvent, and washing the reaction admixture with an aqueous acid solution to produce a mixture of endo-brevicomin and exo-brevicomin and distributing said mixture in an anti-propagation effective amount in regions desired to be controlled.

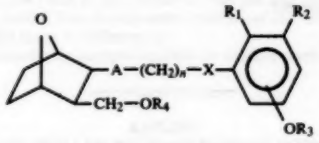
4,695,585

7-OXABICYCLO(2.2.1)HEPTANE ANALOGS USEFUL AS INHIBITORS OF 5-LIPOXYGENASE AND CYCLOOXYGENASE

Ravi K. Varma, Belle Mead, and Eric M. Gordon, Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 23, 1986, Ser. No. 910,583
Int. Cl.[4] A61K 31/34; C07D 307/00
U.S. Cl. 514—469 28 Claims

1. A compound of the formula



wherein R_1 is hydrogen, hydroxy, alkoxy or aryloxy; R_2 is hydrogen, hydroxy, alkoxy or aryloxy; or wherein R_1 and R_2 taken together is a benzene ring; R_3 is hydrogen or lower alkyl; R_4 is lower alkyl, alkenyl of 2–8 carbon atoms or alkynyl of 2–8 carbon atoms; X is amino, alkylamino, alkanoylamino, oxygen or a single bond; A is —CH_2 —CH=Ch— or a single bond; and n is an integer from 0 to 9, with the provisos that when A is a single bond, n is an integer from 1 to 9 and that when X and A are both single bonds, n is an integer from 6 to 9; including all stereoisomers thereof;

wherein the term alkoxy by itself or as part of another group represents both straight and branched chain radicals of up to 12 carbon atoms;

the term alkyl by itself or as part of another group represents both straight and branched chain radicals of up to 12 carbons, chain as well as such groups substituted by F, Br, Cl, I, CF_3, an alkoxy substituent, an aryl substituent, an aralkyl substituent, a haloaryl substituent, a cycloalkyl substituent, an alkylcycloalkyl substituent, hydroxy, an alkylamino substituent, an alkanoylamino substituent, an arylcarbonylamino substituent, a nitro substituent, a cyano substituent, a thiol substituent or an alkythio substituent;

the term aryloxy by itself or as part of another group represents substituted or unsubstituted phenoxy or naphthoxy;

wherein the substituent on either the phenoxy or naphthoxy is selected from the group consisting of 1 or 2 lower alkyl groups, 1 or 2 halogens, 1 or 2 lower alkoxy groups, 1 or 2 hydroxyl groups, 1 or 2 alkylamino groups, 1 or 2 alkanoylamino groups, 1 or 2 nitro groups, 1 or 2 cyano groups, lor 2 thiol groups and/or 1 or 2 alkylthio groups.

25. A method of simultaneously inhibiting arachidonic acid cyclooxygenase and arachidonic acid 5-lipoxygenase which comprises administering to the circulatory system of a mammalian host an effective amount of a compound as defined in claim 1.

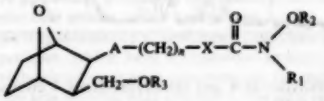
4,695,586

7-OXABICYCLO(2.2.1)HEPTANE-BASED DERIVATIVES USEFUL AS ANTIINFLAMMATORY, ANTIASTHMA AND ANTIPSORATIC AGENTS

Ravi K. Varma, Belle Mead; Sam T. Chao, East Windsor, and Eric M. Gordon, Pennington, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Sep. 23, 1986, Ser. No. 910,597
Int. Cl.[4] A61K 31/557; C07D 307/00
U.S. Cl. 514—469 12 Claims

1. A compound of the formula



wherein R_1 is hydrogen, lower alkyl, alkenyl, aryl or aralkyl; R_2 is hydrogen, lower alkyl, aralkyl, alkanoyl or aroyl; R_3 is lower alkyl, alkenyl or alkynyl; A is —CH_2—CH=CH— or a single bond; X is oxygen, sulfur or NH; n is an integer from 1 to 8; and all stereoisomers thereof; wherein the term lower alkyl or alkyl refers to straight and branched chain radicals of up to 12 carbons, as well as such groups including a halo-substituent, an alkoxy substituent, an aryl substituent, an aralkyl substituent, a haloaryl substituent, a cycloalkyl substituent, an alkylcycloalkyl substituent, hydroxy, an alkylamino or dialkylamino substituent, an alkanoylamino substituent, an arylcarbonylamino substituent, a nitro substituent, a cyano substituent, a thiol substituent or an alkylthio substituent;

the term alkenyl refers to an unsaturated hydrocarbon group having from 2 to 8 carbons and a single carbon-carbon double bond;

the term alkynyl refers to an unsaturated hydrocarbon group having from 2 to 8 carbons and a single carbon-carbon triple bond;

the term aryl by itself, or as a part of aralkyl or aroyl, refers to monocyclic or bicyclic aromatic groups containing from 6 to 10 carbons in the ring portion, selected from phenyl, naphtyl, substituted phenyl or substituted naphtyl wherein the substituent on either the phenyl or naphthyl may be 1 or 2 lower alkyl groups, 1 or 2 halogens selected from CL, Br or F, 1 or 2 lower alkoxy groups, 1 or 2 hydroxyl groups, 1 or 2 alkylamino or dialkylamino groups, 1 or 2 alkanoylamino groups, 1 or 2 arylcarbonylamino groups, 1 or 2 amino groups, 1 or 2 nitro groups, 1 or 2 cyano groups, 1 or 2 thiol groups and/or 1 or 2 alkylthio groups;

the term aralkyl or aryl-alkyl refers to said alkyl groups substituted with one of said aryl groups;

the term alkanoyl refers to a group comprising a carbonyl and one of said alkyl groups; and,

the term aroyl refers to a group comprising a carbonyl and one of said aryl groups.

9. A method of simultaneously inhibiting arachidonic acid cyclooxygenase and arachidonic acid 5-lipoxygenase which comprises administering to the circulatory system of a mammalian host an effective amount of a compound as defined in claim 1 or a pharmaceutically acceptable salt thereof.

4,695,587

M-4 AND ISOM-4 DERIVATIVES, THEIR PREPARATION AND COMPOSITIONS CONTAINING THEM

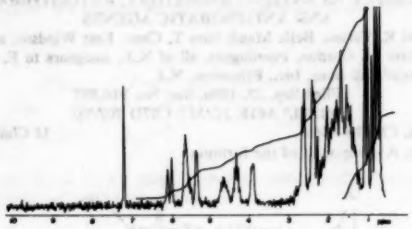
Akira Terahara, and Minoru Tanaka, both of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Division of Ser. No. 372,696, Apr. 28, 1982, Pat. No. 4,479,965. This application Apr. 26, 1984, Ser. No. 604,056

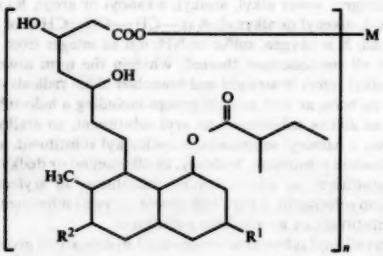
Claims priority, application Japan, May 7, 1981, 56-68646

Int. Cl.[4] A61K *31/215, 31/22;* **C07C** *69/33, 69/675*

U.S. Cl. 514—510 **17 Claims**



1. The tetrahydro-M-4 and tetrahydro-IsoM-4 compounds of the formula (III):



(III)

wherein

one of R^1 and R^2 represents a hydrogen atom and the other represents a hydroxy group;

M represents a metal atom selected from the group consisting of alkali metals, alkaline earth metals, aluminum, iron, zinc, nickel and cobalt; and

n represents the valency of the metal atom M.

4,695,588

FLUORINATED AMINO ACIDS

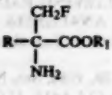
Janos Kollonitsch, Westfield, and Arthur A. Patchett, Cranford, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 802,391, Jun. 1, 1977, Pat. No. 4,325,961. This application Mar. 16, 1978, Ser. No. 886,601

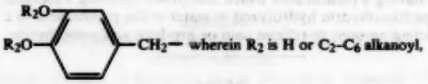
Int. Cl.[4] A61K *31/195, 31/24;* **C07C** *101/04, 101/18*

U.S. Cl. 514—538 **25 Claims**

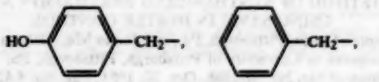
1. A compound having the formula

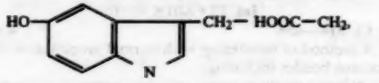


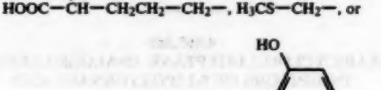
wherein R is a substituted C_1–C_4 alkyl group selected from

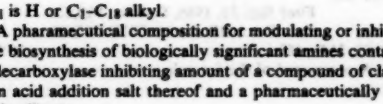


wherein R_2 is H or C_2–C_6 alkanoyl,









and R_1 is H or C_1–C_{18} alkyl.

23. A pharamecutical composition for modulating or inhibiting the biosynthesis of biologically significant amines containing a decarboxylase inhibiting amount of a compound of claim 1 or an acid addition salt thereof and a pharmaceutically acceptable diluent.

4,695,589

ALPHA-(AMINOALKYL-4-HYDROXY-3-(ALKYLTHIO)-BENZENEMETHANOLS

Richard E. Philion, Sand Lake, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

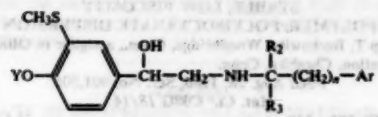
Continuation-in-part of Ser. No. 937,926, Aug. 30, 1978, abandoned, which is a continuation-in-part of Ser. No. 803,372, Jun. 3, 1977, abandoned, which is a continuation-in-part of Ser. No. 699,856, Jun. 25, 1976, abandoned. This application May 27, 1983, Ser. No. 499,102

The portion of the term of this patent subsequent to Feb. 15, 2000, has been disclaimed.

Int. Cl.[4] A01N *33/02*

U.S. Cl. 514—653 **8 Claims**

1. A compound having the formula



wherein

R_2 and R_3 are independently hydrogen or lower alkyl;

n is the integer 1 or 2;

Ar is lower alkoxyphenyl; and

Y is hydrogen or lower alkanoyl;

or an acid addition salt thereof.

2. A compound according to claim 1 wherein Ar is 4-methoxyphenyl.

7. The method of lowering blood pressure in a mammal which comprises administering to said mammal a blood pressure lowering effective amount of a compound according to claim 2.

4,695,590

METHOD FOR RETARDING AGING

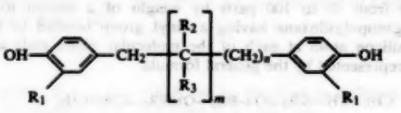
Richard D. Lippman, Scottsdale, Ariz., assignor to California Health Technologies, Los Angeles, Calif.

Filed May 5, 1986, Ser. No. 859,464

Int. Cl.⁴ A61K 31/045

U.S. Cl. 514—724 **16 Claims**

1. A method for retarding aging in humans by administering to a human a daily dosage of from about 0.5 mg per kilogram of body weight to less than about 2 mg per kilogram of body weight of a pharmaceutically acceptable composition comprising a compound or a mixture of compounds represented by the following structural formula:



(I)

wherein

m is 0, 1 or 2;

n is 0 or 1;

R1 is hydrogen, halogen or hydroxy; and

R2 and R3 each independently represents hydrogen or methyl provided that when m is 0, n is 0 and when m is 1 or 2, n is 1 and R1 is hydroxy or halogen and that when m is 2, each R2 can be the same or different and each R3 can be the same or different or

a pharmaceutically acceptable alkali or alkaline earth metal salt thereof.

4,695,591

CONTROLLED RELEASE DOSAGE FORMS COMPRISING HYDROXYPROPYLMETHYLCELLULOSE

Gayda Hanna, Berwyn, Pa., and Winston A. Vadino, Bridgewater, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 718,036, Mar. 29, 1985. This application Nov. 22, 1985, Ser. No. 801,130

Int. Cl.⁴ A61K 31/74, 9/20, 9/22

U.S. Cl. 514—781 **2 Claims**

1. A controlled release dosage form comprising a combination of an analgesic-effective amount of acetaminophen, an anti-histaminic-effective amount of dexbrompheniramine maleate, a decongestive-effective amount of pseudoephedrine sulfate and hydroxypropyl methylcellulose U.S.P. 2910 as the carrier base, wherein said hydroxypropyl methylcellulose constitutes 4.6 to 12 weight-% of the total dosage form.

4,695,592

HYDROPHILIZED POROUS MEMBRANE AND PRODUCTION PROCESS THEREOF

Hajime Itoh, Hiroshima, and Kazutami Mitani, Ohtake, both of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jan. 2, 1987, Ser. No. 70

Claims priority, application Japan, Jan. 7, 1986, 61-000951; Sep. 19, 1986, 61-221465

Int. Cl.⁴ C08J 9/40

U.S. Cl. 521—84 **5 Claims**

1. A process for the production of a hydrophilized porous membrane, which comprises the steps of (A) holding at least diacetone acrylamide, a crosslinkable monomer, and a polymerization initiator on at least a part of the pore walls of a starting porous membrane of a polyolefin which has been rendered porous by a stretching technique, and (B) heating them to polymerize these monomers.

4,695,593

PREFOAMED PROPYLENE POLYMER-BASE PARTICLES, EXPANSION-MOLDED ARTICLE PRODUCED FROM SAID PARTICLES AND PRODUCTION PROCESS OF SAID ARTICLE

Hideki Kuwabara, Hadano; Atsushi Kitagawa, and Yoshimi Sudo, both of Fujisawa, all of Japan, assignors to Japane Styrene Paper Corporation, Tokyo, Japan

Filed Feb. 21, 1986, Ser. No. 831,548

Int. Cl.⁴ C08J 9/24

U.S. Cl. 521—60 **4 Claims**

1. A process for producing an expansion-molded propylene polymer-base article, which comprises:

imparting foamability to prefoamed propylene polymer-base particles, which have a crystalline structure featuring a high-temperature peak appearing on the higher temperature side than the peak inherent to the propylene polymer-base resin on the DSC curve obtained by differential scanning calorimetry upon heating 1–3 mg of the prefoamed propylene polymer-base particles at a constant heating rate of 10° C./min to 220° C. by means of a differential scanning calorimeter and an internal pressure decreasing velocity coefficient k of 0.70 or smaller ($k \leqq 0.70$) at 25° C. and 1 atm;

filling the resultant particles in a mold; and

heating the particles so as to cause their expansion, thereby obtaining the articles which conform in shape with the mold.

4,695,594

MODIFIED FLAME RETARDANT POLYPHENYLENE ETHER RESINS HAVING IMPROVED FOAMABILITY AND MOLDED ARTICLES MADE THEREFROM

Eric Pressman, East Greenbush, N.Y., assignor to General Electric Company, Selkirk, N.Y.

Filed Aug. 27, 1986, Ser. No. 900,705

Int. Cl.⁴ C08J 9/08

U.S. Cl. 521—92 **10 Claims**

1. A method of producing a foamed flame retardant thermoplastic composition substantially free of surface streaking and without odor generation, said composition comprising (a) a polyphenylene ether, alone, or in combination with a styrene resin; (b) an effective flame retarding amount of a halogenated flame retardant, alone, or in further combination with an antimony compound, said method comprising (i) adding to said composition an effective foam generating amount of (c) a foaming agent comprising citric acid and sodium bicarbonate; and (ii) foaming the composition of step (i).

4,695,595

PROCESS FOR THE PRODUCTION OF CELLULAR ORGANIC SILICATE PRODUCTS

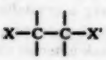
David H. Blount, 6728 Del Cerro Blvd., San Diego, Calif. 92120

Division of Ser. No. 892,834, Aug. 4, 1986, Pat. No. 4,663,363.
This application Jan. 5, 1987, Ser. No. 443
Int. Cl.[4] C08J 9/00
U.S. Cl. 521—99 10 Claims

1. The process for the production of foamed organic silicate products which consist of mixing and reacting the following components:

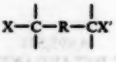
A. a substituted organic compound having the graphical skeleton carbon structure of

wherein X represents the substituents which split off during the reaction; the R, R′ and R″ are selected from the following groups: hydrogen, saturated straight-chain carbon atoms, unsaturated carbon atoms, ether linkages, ester linkages, aromatic structures, another X and mixtures thereof; the X substituents are selected from the following group, halogens, acid sulfate, nitrate, acid phosphate, bicarbonate, sulfate, formate, acetate, propionate, laurate, oleate, stearate, acid oxalate, acid malonate, acid tartrate, acid citrate and mixtures thereof, or wherein the substituted organic compound is a polysubstituted organic compound having the graphical skeleton carbonstructure of



where

represents two adjacent carbon atoms or



where X and X′ represent the substituents which split off during the reaction and are selected from the group consisting of halogen, acid sulfate, nitrate, acid phosphate, bicarbonate, formate, acetate, propionate, laurate, oleate, stearate, oxalate, acid malonate, acid tartrate, acid citrate and mixtures thereof; the R between the pair of reactive carbon atoms is selected from the following groups, saturated straight-chain carbon atoms, unsaturated carbon atoms, ether linkage, ester linkages, aromatic structures and mixtures thereof, in the amount of 1 to 100 parts by weight;

B. alkali oxidated silicon compound, in the amount of 100 parts by weight;

C. free-radical initiator in the amount of 0.1 to 10 parts by weight,

D. a blowing agent.

4,695,596

STABLE, LOW VISCOSITY POLYMER/POLYISOCYANATE DISPERSION

Phillip T. Berkowitz, Woodbridge, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Aug. 28, 1986, Ser. No. 901,505
Int. Cl.[4] C08G 18/14
U.S. Cl. 521—137 24 Claims

1. A stable polymer/polyisocyanate dispersion comprising:

(a) a polyisocyanate and

(b) a polymer which is a reaction product of an ethylenically unsaturated macromol-ecular monomer and at least one other ethylenically unsaturated monomer.

4,695,597

ORGANOPOLYSILOXANE COMPOSITION FOR FIRE-RESISTANT FOAMED SILICONE RUBBER

Masanori Seino, Gunma, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Aug. 19, 1986, Ser. No. 898,132
Claims priority, application Japan, Aug. 20, 1985, 60-182739
Int. Cl.[4] C08G 77/00
U.S. Cl. 521—154 9 Claims

1. A foamable organopolysiloxane composition capable of being converted into a cured foamed silicone rubber which comprises:

(a) 100 parts by weight of a first diorganopolysiloxane having a hydroxy group bonded to the silicon atom at each of the molecular chain ends and represented by the general formula

$$HO—SiR_2—(O—SiR_2—O)_m—SiR_2—OH,$$

in which R is a monovalent hydrocarbon group free from aliphatic unsaturation and m is a positive integer in the range from 5 to 10,000;

(b) from 10 to 100 parts by weight of a second diorganopolysiloxane having a vinyl group bonded to the silicon atom at each of the molecular chain ends and represented by the general formula

$$CH_2=CH—SiR_2—O—(SiR_2—O)_nSiR_2—CH=CH_2,$$

in which R has the same meaning as defined above and n is a positive integer in the range from 10 to 1000;

(c) an organohydrogenpolysiloxane having, in a molecule, at least two hydrogen atoms directly bonded to the silicon atoms in such an amount that from 2.0 to 40.0 moles of the silicon-bonded hydrogen atoms are provided per mole of the overall amount of the hydroxy groups in the first diorganopolysiloxane and the vinyl groups in the second diorganopolysiloxane;

(d) from 5 to 100 parts by weight of an inorganic filler;

(e) a platinum compound in a catalytic amount;

(f) from 5 to 100 parts by weight of aluminum hydroxide; and

(g) from 0.1 to 5 parts by weight of red phosphorus.

4,695,598

EPOXY RESIN COATING COMPOSITION

Hiraku Yamamoto; Toshimichi Suzuki; Shigeru Katayama; Isao Uratsuka, and Eishi Asoshina, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 2, 1986, Ser. No. 847,333
Claims priority, application Japan, Apr. 3, 1985, 60-70397
Int. Cl.[4] C08K 3/08
U.S. Cl. 523—400 8 Claims

1. An epoxy resin coating composition comprising a rubber-modified epoxy resin which is obtained by reacting an expoxy resin with a carboxyl group-containing butadiene-acrylonitrile rubber, a phenoxy resin, a metal powder, a curing component, and an organic solvent, wherein the amount of phenoxy resin is from 40 to 90 percent by weight based on the total weight of

said phenoxy resin and rubber-modified epoxy resin and wherein the amount of said metal powder is from 25 to 75 percent by weight based on the weight of the solids content in the composition.-

---

4,695,599

USE OF DIPIPERIDINE-DI-CARBAMATES AS STABILIZERS FOR SYNTHETIC POLYMERS

Giuseppe Cantatore, Bitonto, Italy, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

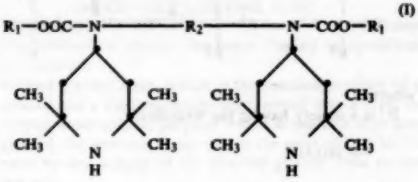
Continuation of Ser. No. 606,456, May 2, 1984, abandoned. This application Oct. 4, 1985, Ser. No. 783,804

Claims priority, application Italy, May 3, 1983, 20900 A/83

Int. Cl.[4] C08K 5/34

U.S. Cl. 524—103 8 Claims

1. A light-stabilised, heat-stabilised and oxidation-stabilised polymer composition, which comprises a synthetic polymer and a stabilizing amount of one or more of the stabilisers of the formula (I)



(I)

in which R_1 is C_1–C_{12}-alkyl, C_3–C_{12}-alkenyl, C_5–C_{12}-cycloalkyl or phenyl or hydroxyphenyl which are unsubstituted or substituted by 1 to 3 C_1–C_4-alkyl groups or by benzyl or hydroxybenzyl which are unsubstituted or substituted by 1 to 3 Cl_1–C_4-alkyl groups, R_2 is C_1–C_{18}-alkylene, C_5–C_{18}-cycloalkylene, C_6–C_{18}-arylene, C_7–C_{18}-aralkylene or a radical of the formula (II)

(II)

in which R_3 and R_4, which can be identical or different, are C_2–C_6-alkylene, n is 1 or 2 and X is —O —or

with R_5 being C_1–C_{12}-alkyl, C_5C_{12}-cycloalkyl, C_6–C_{12}-aryl, C_7–C_{12}-aralkyl, 2,2,6,6-tetramethyl-piperidin-4-yl or a radical —$COOR_1$ in which $R_1$is as defined above.

4,695,600

TETRAALKYLPIPERIDINES

Lajos Avar, Biel-Benken, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

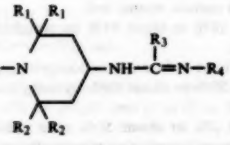
Filed Jun. 17, 1986, Ser. No. 875,130

Claims priority, application United Kingdom, Jun. 20, 1985, 8515672

Int. Cl.[4] C07D 417/12, 417/14; C08K 5/34

U.S. Cl. 524—103 14 Claims

1. A compound of formula I



(I)

in which R is hydrogen, unsubstituted C_{1-18}alkyl, unsubstituted C_{1-21}alkylcarbonyl, unsubstituted C_{2-18}alkenylcarbonyl, C_{1-21}alkoxycarbonyl, phenylcarbonyl, phenylC_{1-4}alkylcarbonyl, C_{1-4}alkylphenylcarbonyl, oxygen or

where

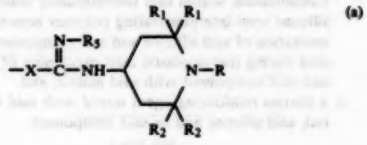
R_6 is

or —NR_7R_8; R_7 being hydrogen, C_{1-12}alkyl, C_{5-6}cycloalkyl, phenyl or C_{1-12}alkyl-phenyl and R_8 is hydrogen or C_{1-12}alkyl;

R_1 is —CH_2—C_{1-4}alkyl or —CH_3 or both R_1s together form —$(CH_2)_5$;

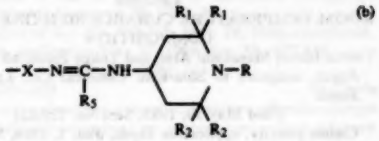
R_2 is —CH_2—C_{1-4}alkyl or —CH_3 or both R_2s together form —$(CH_2)_5$;

R_3 is unsubstituted C_{1-18}alkyl; phenyl, unsubstituted or substituted by 1, 2 or 3 groups selected from C_{1-18}alkyl, C_{1-4}alkoxy and halogen; or is a group (a)

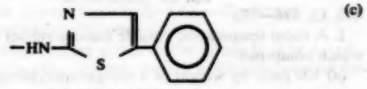


(a)

R_4 is C_{1-18}alkyl; phenyl, unsubstituted or substituted by 1 to 3 groups selected from C_{1-18}alkyl, C_{1-4}alkoxy and halogen; or is a group (b) or (c)



(b)



(c)

where X is a direct bond or a bridging group and R_5 is unsubstituted C_{1-18}alkyl or phenyl unsubstituted or substituted by 1 to 3 groups selected from C_{1-18}alkyl, C_{1-4}alkoxy and halogen;

with the proviso that when R_3 is a group (a) R_4 is not a group (b).

6. A polymeric composition comprising a polymeric material and a compound of formula I according to claim 1.

4,695,601

POLYPHENYLENE ETHER THERMOPLASTIC PROTECTED FROM DISCOLORATION DURING PROCESSING

Yuval Halpern, Skokie, Ill., assignor to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Filed Nov. 12, 1986, Ser. No. 929,445

Int. Cl.[4] C08K 5/07

U.S. Cl. 524—362 14 Claims

1. A thermoplastic composition comprising a polyphenylene ether and an alpha-hydroxyketone, said ketone being present in

an amount sufficient to suppress discoloration of the composition during processing.

4,695,602

FIBER REINFORCED THERMOPLASTICS CONTAINING SILICONE INTERPENETRATING POLYMER NETWORKS

Jane M. Crosby, Wilmington, Del., and MaryGail K. Hutchins, Philadelphia, Pa., assignors to LNP Corporation, Malvern, Pa.

Filed Feb. 28, 1985, Ser. No. 707,121
Int. Cl.[4] C08K *7/16, 7/14, 7/10, 7/06*
U.S. Cl. 524—439 **22 Claims**

1. A melt processable composition comprising:

a. a thermoplastic matrix material comprising a thermoplastic which has an unfilled flexural modulus greater than 90,000 psi;

b. a hydride group-containing silicone and a component which will react with said hydride group-containing silicone, said silicone and said component being selected and present in sufficient amounts to react with each other by vulcanization within said thermoplastic matrix to form a silicone semi-interpenetrating polymer network, said vulcanization of said silicone and said component being initiated during thermoplastic melt-processing of said silicone and said component with said matrix; and

c. a fibrous reinforcing agent mixed with said matrix material, said silicone and or said component.

4,695,603

ROOM TEMPERATURE CURABLE SILICONE RUBBER COMPOSITION

Yoshio Inoue; Masatoshi Arai, and Takeo Inoue, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed May 30, 1985, Ser. No. 739,421
Claims priority, application Japan, Jun. 1, 1984, 59-112752
Int. Cl.[4] C08L *83/08*
U.S. Cl. 524—723 **3 Claims**

1. A room temperature curable silicone rubber composition which comprises:

(a) 100 parts by weight of a diorganopolysiloxane having a viscosity ranging from 100 to 1,000,000 centistokes, which is terminated at both molecular chain ends with a silanolic hydroxy group bonded to the terminal silicon atom;

(b) from 0.01 to 25 parts by weight of an organosilicon compound having at least two hydrolyzable groups bonded to the silicon atoms in a molecule;

(c) from 0.01 to 5.0 parts by weight of a surface active agent having at least one fluorine atom in a molecule;

(d) from 0.01 to 10 parts by weight of an organosilicon compound having, in a molecule, at least one organosilicon unit epresented by the general formula

$$R^1—CO—NR^2—CH_2)_bSiR^3_aO_{(3-a)2}$$

in which R^1, R^2 and R^3 may be the same or different and are elected from the group consisting of monovalent hydrocarbon having from 1 to 8 carbon atoms, monovalent hydrocarbon having 1 to 8 carbon atoms substituted with halogen or cyano and hydrogen, a is zero, 1, 2 or 3 and b is a positive integer not larger than 10; and (e) from 1 to 400 parts by weight of a filler.

4,695,604

ELECTRON BEAM CURABLE POLYUETHANE POLYMERS FOR MAGNETIC TAPE APPLICATIONS

Charles J. Amirsakis, Lake Geneva, Wis., assignor to Morton Thiokol, Inc., Chicago, Ill.

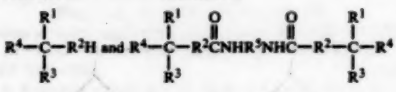
Filed Jan. 16, 1985, Ser. No. 692,444
Int. Cl.[4] C08L *75/06, 33/08*
U.S. Cl. 525—28 **19 Claims**

1. A substantially uncrosslinked, electron beam crosslinkable polyurethane resin which is the reaction product of:

A. from about 34% to about 75% by weight of hydroxyl terminated polyester which is a reaction product of an alpha-omega dicarboxylic acid and a lower alkyl diol;

B. from about 5% to about 22% by weight of an unsaturated compound having a structure selected from:

Structure I Structure II



wherein

R^1 is a moiety having the structure:

$$—(CH_2)_xOH,$$

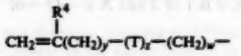
R^2 is a moiety having the structure:

$$—(CH_2)_xO—$$

wherein the oxygen atom is part of a carbamate linkage in Structure II,

x_3 can be 0, 1, or 2,

R^3 is a moiety having the structure:



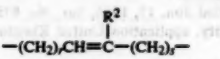
T is selected from carbonyl and ether linkages,

y is 0 or 1,

z is 0 or 1,

w is 0, 1, or 2,

R^4 is selected from —H and $—CH_3$, or R^3 and R^4 together form a divalent ring-forming moiety having the structure



wherein

r and s are independently 0, 1, 2, or 3, and

R^5 is an aliphatic hydrocarbon moiety having from about 6 about 36 carbon atoms; and

C. from about 18% to about 44% by weight of an organic diisocyanate.

17. A polyurethane resin mixture comprising:

A. from about 50% to about 98% by weight of the resin of claim 1; and

B. from about 2% to about 50% of a urethane acrylate product obtained by reacting trimethylolpropane, toluene diisocyanate, and 2-hydroxyethyl acrylate.

4,695,605
SAG RESISTANT, HIGH PERFORMANCE EPOXY STRUCTURAL ADHESIVES

Anil B. Goel, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Oct. 1, 1986, Ser. No. 913,903
Int. Cl.[4] C08G *18/30*
U.S. Cl. 525—109 12 Claims

1. An adhesive composition comprising a mixture of a first component comprising a polyepoxide and a polyisocyanate said polyisocyanate having been allowed to react with a primary or secondary polyamine and a second component comprising a hardener which is a mixture of primary, secondary, and tertiary amines, amido amines, and phenolics.

4,695,606
COATING BINDER ADDITIVE

William C. Floyd, Chester, and Sai H. Hui, Rock Hill, both of S.C., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Sep. 22, 1986, Ser. No. 909,621
Int. Cl.[4] C08F *8/28*; C08L *61/00*
U.S. Cl. 525—160 11 Claims

1. An additive for binders for paper coating compositions which comprises:

a blocked glyoxal resin, which is the reaction product of a glyoxal and a blocking component, mixed with a vinyl or acrylic water soluble polymer which is reactive with free glyoxal, the amounts being within the ratio of 25:1 to 1:2 parts by dry weight of the blocked glyoxal resin to the polymer.

4,695,607
GROUP TRANSFER PROCESSES FOR ACRYLIC STAR POLYMERS

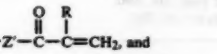
Harry J. Spinelli, Wilmington, Del., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 627,919, Jul. 5, 1984, abandoned. This application Sep. 3, 1985, Ser. No. 771,684
Int. Cl.[4] C08F *293/00, 295/00, 297/00*
U.S. Cl. 525—272 4 Claims

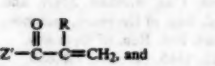
1. An arm/core process for preparing acrylic star polymers which comprise

a. a crosslinked core comprising a polymer derived from a mixture of monomers (A) comprising

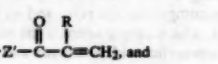
i. 1–100% by weight of one or more monomers each having at least two groups.



ii. 0–99% by weight of one or more monomers, each having one group,



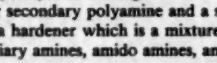
b. attached to the core, at least 5 arms comprising polymer chains derived from one or more monomers (B), each having one group,



in each of which R is the same or different and is H, $CH_3C_3CH_2$, CN or CO_2R' and Z' is O or NR', wherein R'is C_{1-4} alkyl, and

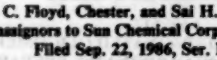
c. attached to the core or to at least some of the arms, living group transfer polymerization sites which are $(R^1)_3M$ wherein; R is selected from the group consisting of C_{1-10} alkyl and C_{6-10} aryl or alkaryl; and M is Si, Sn, or Ge, said process comprising group transfer polymerization utilizing a tetracoordinate organosilicon, organotin or organogermanium polymerization initiator having at least one initiating site, and a catalyst suitable for group transfer polymerization, involving the sequential steps of

a. preparing a living arm polymer by reacting the transfer initiator with one or more monomers (B), each having one group

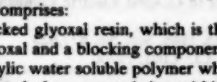


b. contacting the resulting living polymers in the presence of the catalyst with a mixture of monomers (A) comprising

i. 1–100% by weight of one or more monomers each having at least two groups,



ii. 0–99% by weight of one or more monomers, each having one group,



4,695,608
CONTINUOUS PROCESS FOR MAKING POLYMERS HAVING PENDANT AZLACTONE OR MACROMOLECULAR MOIETIES

David A. Engler, Woodbury, and Anthony R. Maistrovich, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

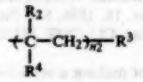
Continuation of Ser. No. 594,555, Mar. 29, 1984, abandoned. This application May 27, 1986, Ser. No. 867,519
Int. Cl.[4] C08F *265/04*
U.S. Cl. 525—308 34 Claims

1. A process of making a pressure sensitive adhesive composition by bulk polymerizing one or more free radical polymerizable vinyl compounds with one or more macromer represented by the general formula $X-(Y)_{n1}-Z$ wherein

X is a copolymerizable vinyl group;

Y is a divalent linking group where n_1 can be 0 or 1; and

Z is a monovalent polymer moiety having the general formula



wherein R^2 is hydrogen or a lower alkyl group, R^3 is a lower alkyl group, n_2 is an integer from 40 to 500 and R^4 is

wherein R^5 is hydrgen or a lower alkyl group; which process comprises:

(a) continously feeding to a wiped surface reactor, comprising a vessel and at least one rotor inside the vessel having

a wiping portion located close to the inside surface of the vessel and a root portion spaced substantially further from said inside surface than the wiping portion wherein the root surface is wiped continously during rotation of the rotor, raw materials which comprise unpolymerized vinyl compound without any substantial amount of polymerized vinyl compound, the macromer, and at least one initiator for free radical polymerization under the following conditions:

(i) all raw materials being fed substantially free of oxygen, and

(ii) at least one raw material being a liquid unpolymerized vinyl compound having a viscosity less than about 4,000 centipoise which is fed under a pressure at least as high as the vapor pressure of the combined raw materials at the temperature to which the exotherm of the free radical polymerization brings them in the reactor;

(b) reacting the raw materials to desired conversion; and

(c) continuously withdrawing a polymeric material from the reactor.

4,695,609

VULCANIZABLE RUBBER COMPOSITIONS CONTAINING XANTHOGEN POLYSULFIDE AND XANTHATE COMPOUNDS

Arthur Stevenson, West Midlands, United Kingdom, assignor to Robinson Brothers Limited, West Bromwich, United Kingdom

Filed Oct. 22, 1985, Ser. No. 790,136

Claims priority, application United Kingdom, Oct. 25, 1984, 8427009; May 3, 1985, 8511378

Int. Cl.[4] C08C *19/20*

U.S. Cl. 525—352 **12 Claims**

1. A vulcanizable composition which comprises 100 parts by weight rubber; from about 1 to about 6 parts by weight dihydrocarbyl xanthogen polysulfide of the formula $R^1O—C(=S)—S_x—SC(=S)—OR^2$ wherein R^1 and R^2 are the same or different and selected from the group consisting of alkyl, cycloalkyl and N-free heterocyclic groups and x is an integer of at least 2; from about 0.01 to about 5 parts by weight of a xanthate compound selected from the group consisting of dihydrocarbyl xanthates and metal hydrocarbylxanthates of the formula $R^4O—CS—S—R^5$ wherein R^4 is selected from the group consisting of alkyl, cycloalkyl and N-free heterocyclic groups and R^5 is selected from the group consisting of a metal and R^4; and less than 0.4 parts by weight of nitrosatable materials.

4,695,610

SEMI-2-INTERPENETRATING NETWORKS OF HIGH TEMPERATURE SYSTEMS

Annmarie O. Egli, Gloucester, and Terry L. St. Clair, Poquoson, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 18, 1986, Ser. No. 840,816

Int. Cl.[4] C08F *283/04*

U.S. Cl. 525—426 **12 Claims**

1. In the method of making a semi-2-interpenetrating polymer network wherein a linear polymer is combined with a cross-linkable oligomer, the improvement wherein the linear polymer comprises polyimidesulfone and the cross-linkable oligomer comprises acetylene-terminated polyimidesulfone.

4,695,611

LACTAM POLYMERIZATION INITIATORS

Edward H. Mottus, Ballwin, and Ross M. Hedrick, St. Louis, both of Mo., assignors to DSM Rim Nylon V.O.F., Geleen, Netherlands

Division of Ser. No. 838,643, Mar. 11, 1986. This application Nov. 28, 1986, Ser. No. 935,725

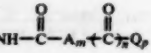
Int. Cl.[4] C08L *77/00*

U.S. Cl. 525—432 **29 Claims**

1. The composition comprising:

a lactam monomer; and

the lactam polymerization initiator having at least two lactam terminal groups of the formula:



wherein Q is a lactam residue containing a C_3–C_{11} alkylene group and bonded to a carbonyl through the nitrogen atom of the lactam; A is an aliphatic or aromatic hydrocarbyl or hydrocarbyl ether group; m is 0 or 1; when m is 0, n is 0 or 1 and p is 1; when m is 1, n is in the range of 1 to 3 and p=n; and an elastomeric backbone derived from a telechelic polyamine containing at least two primary or secondary amine groups.

4,695,612

SECONDARY AMINE-TERMINATED OLIGOMERS AND COPOLYURETHANECARBONATES PREPARED THEREFROM

Tohru Takekoshi, Scotia, and Patricia P. Anderson, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

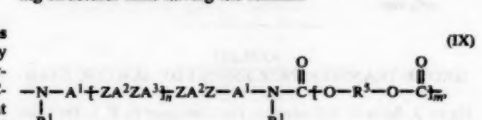
Filed Jun. 23, 1986, Ser. No. 877,623

Int. Cl.[4] C08L *79/00*

U.S. Cl. 525—433 **10 Claims**

1. A block copolyurethanecarbonate composition comprising structural units having the formula

(IX)



wherein:

R^1 is C_{1-4} alkyl or phenyl;

each of A^1, A^2 and A^3 is independently an aromatic radical, with A^1 and A^3 being divalent and A^2 being divalent or tetravalent;

Z is a bridging radical containing at least one non-carbon linking atom;

n is from 0 to about 20;

about 60% of the total number of R^5 radicals are aromatic organic radicals and the remainder are aliphatic, alicylic or aromatic organic radicals, and

m is in the range of about 10–500.

4,695,613

POWDER VARNISH COMPOSITIONS CONTAINING CARBOXY CURING AGENTS

Juergen Olbrich, Dorsten; Uwe Blethan, Marl, and Gernold Sorge, Herne, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 23, 1985, Ser. No. 778,658

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1984, 3434917

Int. Cl.[4] C08G *59/14, 59/16;* **C08L** *63/00*

U.S. Cl. 525—533 **30 Claims**

1. In a process for curing an epoxy resin composition, comprising heating a mixture comprising the resin and an effective amount of a curing agent, which curing agent is the neutralization product of a polycarboxylic acid precursor and a cyclic amidine, the improvement wherein the polycarboxylic acid precursor is an oligoester which is the product of a C_{4-18} hydrocarbon, aliphatic cycloaliphatic or aromatic-polycarboxylic or -dicarboxylic acid and a C_{4-8} hydrocarbon aliphatic or cycloaliphatic diol, said oligoester having an acid number of about 245–265, and wherein in said polycarboxylic acid prod-

uct >25% to 90% of the free carboxy groups in the oligoester are neutralized by said cyclic amidine.

4,695,614

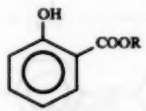
PROCESS FOR PRODUCING AN OLEFIN COPOLYMER RUBBER

Yoshihide Yamazaki; Kazumi Uchimura; Satoshi Yamashita, and Mikio Takeuchi, all of Yokkiachi, Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 702,062, Feb. 15, 1985, abandoned. This application Apr. 7, 1986, Ser. No. 850,067
Claims priority, application Japan, Mar. 2, 1984, 59-38671
Int. Cl.[4] C08F *4/68, 236/20*
U.S. Cl. 526—142 **18 Claims**

1. A process for producing an olefin copolymer rubber, which comprises:

copolymerizing ethylene, at least one α-olefin and at least one non-conjugated diene in a slurried state in a liquid-state α-olefin with substantially no solvent being present for the resulting copolymer in the presence of a catalyst consisting of an organocaluminum compound selected from the group consisting of a trialkylaluminum and a dialkylaluminum monohalide and a modified vanadium compound obtained by contacting a vanadium compound with at least one modifying salicylate compound of the formula:



wherein R is a C_{1-20} alkyl group.

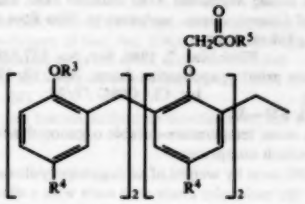
4,695,615

INSTANT ADHESIVE COMPOSITION UTILIZING MIXED FUNCTIONALITY CALIXARENES AS ACCELERATORS

Raymond G. Leonard, Co. Kildare, and Stephen J. Harris, Dublin, both of Ireland, assignors to Loctite (Ireland) Limited, Tallaght, Ireland

Continuation-in-part of Ser. No. 717,251, Mar. 28, 1985, Pat. No. 4,642,362, and a continuation-in-part of Ser. No. 776,536, Sep. 16, 1985, Pat. No. 4,636,539, which is a division of Ser. No. 673,621, Nov. 21, 1984, Pat. No. 4,556,700, and a continuation-in-part of Ser. No. 575,257, Jan. 30, 1984, abandoned. This application Jan. 31, 1986, Ser. No. 825,012
The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.
Int. Cl.[4] C08F *20/34*
U.S. Cl. 526—194 **11 Claims**

1. In a cyanacrylate adhesive composition, the improvement comprising that said composition includes an accelerator in a conventional amount, the accelerator being a calixarene compound stable to cyanocrylate monomers represented by the formula:



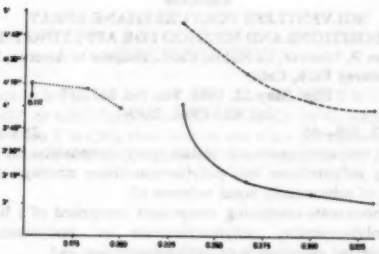
where R^3 is H, $-CH_2C(=O)OH$, $-CH_2C(=O)OR^6$, $-C(=O)R^8$, hydrocarbyl, or trihydrocarbylsilyl or the two R^3 groups together form a divalent hydrocarbyl or oxygen interrupted hydrocarbyl group; R^4 is H or hydrocarbyl; R^5 is hydrocarbyl, hydrocarbyl interrupted by one or more oxygen atoms, or hydrocarbyl sustituted with halo, nitro, or oxo groups; R^6 is as defined for R^5 but different therefrom; and R^8 is as defined for R^5 but the same or different therefrom.

4,695,616

PROCESS FOR POLYMERIZATION OF VINYL CHLORIDE IN SUSPENSION

Adolfo Caporossi, Ravenna, and Leonello Del Signore, L'Aquila, both of Italy, assignors to Anic, S.p.A., Palermo, Italy

Continuation of Ser. No. 448,265, Dec. 9, 1982, abandoned. This application Feb. 11, 1985, Ser. No. 701,433
Claims priority, application Italy, Dec. 11, 1981, 25518 A/81
Int. Cl.[4] C08F *2/20*
U.S. Cl. 526—202 **3 Claims**



1. A process for the polymerization of vinyl chloride monomer in suspension to prepare polymers of high porosity and a vinyl chloride monomer content of less than 2 ppm said process comprising polymerising the vinyl chloride in an aqueous medium in the presence of an adequate quantity of peroxide initiator with or without buffer agents and ionogenic or non-ionogenic wetting agents in the presence of a single component suspending agent which consists of from 0.267 to 0.33% by weight of partially saponified polyvinyl acetate with a saponification number of between about 412 and about 330, that is prepared by controlled alkaline alcoholysis in the presence of methyl acetate and thereafter stripping the unreacted vinyl chloride monomer.

4,695,617

ROOM TEMPERATURE-CURABLE ORGANOPOLYSILOXANE COMPOSITION

Yoshio Inoue; Masatoshi Arai; Shinichi Sato, and Koji Yokoo, all of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,588
Claims priority, application Japan, Mar. 13, 1985, 60-49546
Int. Cl.[4] C08G 77/20
U.S. Cl. 528—32 6 Claims

1. A room temperature-curable organopolysiloxane composition which comprises:

(a) 100 parts by weight of an organopolysiloxane terminated at the molecular chain ends each with a silanolic hydroxy group, of which the content of low molecular constituents having a vapor pressure of 0.01 mmHg or higher at 20° C. is not larger than 0.3% by weight;

(b) from 1 to 25 parts by weight of an alkenyloxy-containing organosilane compound represented by the general formula

$$R^1{}_{n-4}Si(O-CR^3=CH-R^2)_n,$$

in which R^1 is a substituted or unsubstituted monovalent hydrocarbon group, R^2 and R^3 are each a hydrogen atom or a substituted or unsubstituted monovalent hydrocarbon group and the subscript n is a number of 3 or 4, or a partial hydrolysis-condensation product thereof having a vapor pressure of 0.3 mmHg or below at 20° C.; and

(c) from 0.01 to 10 parts by weight of an organosilane or organopolysiloxane compound having, in a molecule, at least on guanidino group represented by the general formula

$$-N=C(NR_2)_2,$$

in which each of the groups denoted by R is, independently from the others, a hydrogen atom or a substituted or unsubstituted monovalent hydrocarbon group, bonded to the silicon atom through a divalent group and having a vapor pressure of 0.3 mmHg or below at 20° C.

4,695,618

SOLVENTLESS POLYURETHANE SPRAY COMPOSITIONS AND METHOD FOR APPLYING THEM

Norman R. Mowrer, La Habra, Calif., assignor to Ameron, Inc., Monterey Park, Calif.

Filed May 23, 1986, Ser. No. 867,337
Int. Cl.[4] C08L 75/04
U.S. Cl. 528—55 21 Claims

1. A two-component solventless spray composition for producing polyurethane and poly(urea)urethane coatings comprised of substantially equal volumes of:

an isocyanate-containing component comprised of a liquid polyisocyanate, polyisocyanurate or isocyanate-terminated prepolymer or quasi-prepolymer; and

a curative component comprised of from about 0% to about 15% by weight of one or more polyamines or alkanolamines in an amount sufficient to react to form a thixotropic mixture about 15 seconds to about 2 minutes after being mixed with the isocyanate-containing component, from about 10% to about 20% by weight of one or more glycols having an equivalent weight in the range from about 30 to about 200, from about 40% to about 80% by weight of one or more high molecular weight polyols or polyamines having an equivalent weight in the range from about 300 to about 2000, and at least about 1% by weight of one or more additives to adsorb moisture or carbon dioxide.

4,695,619

INTUMESCENT FLAME-RESISTANT COATING COMPOSITION

Charles L. Hamermesh, Westlake Village; Paul J. Dynes, Los Angeles, and Peter A. Hogenson, Long Beach, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 17, 1985, Ser. No. 755,872
The portion of the term of this patent subsequent to Dec. 1, 1998, has been disclaimed.
Int. Cl.[4] B32B 3/26, 27/40, 5/18; B05D 3/02
U.S. Cl. 528—73 23 Claims

1. An intumescent fire resistant coating composition comprising about 20 to about 60% of an aromatic polyisocyanate, about 10 to about 40% of an aromatic polycarboxylic compound and about 1 to about 20% furfuryl alcohol, by weight.

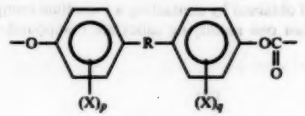
4,695,620

COPOLYCARBONATE RESIN FROM BRANCHED CHAIN ALKYLENE BIS PHENOL

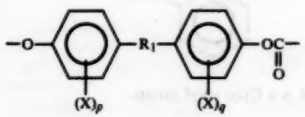
Mitsuhiko Masumoto; Shigeo Yanada, and Tadami Kinugawa, all of Osaka, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Apr. 17, 1986, Ser. No. 853,062
Claims priority, application Japan, Apr. 17, 1985, 60-81592
Int. Cl.[4] C08G 63/62
U.S. Cl. 528—204 4 Claims

1. A copolycarbonate resin having, as constituting units, units of the following formulae A and B:



(A)



(B)

wherein R represents a divalent aliphatic, alicyclic, or phenyl-substituted alkylidene group each having 1 to 15 carbon atoms, or —O—, —S—, —SO—, —SO_2—, or —CO—; R_1 is an aliphatic organic group represented by —$CH(CH_3)$—CH_2—$C(CH_3)_2$—, —$C(CH_3)$=CH—$C(CH_3)_2$—, —$C(=CH_2)$—CH_2—$C(CH_3)_2$—, —$CH(CH_3)$—CH=CH—, or $CH(CH_3)$—CH_2—CH_2—; X represents a halogen atom or a lower alkyl group, and p and q each represents an integer of 0 to 2.

4,695,621

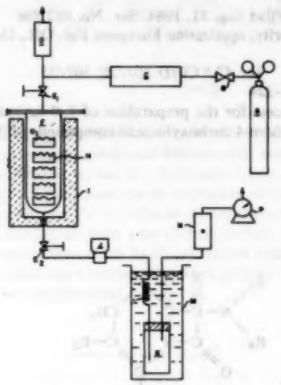
METHOD FOR REDUCING RESIDUAL MONOMERS FROM OVERSIZED FAT IMBIBING COPOLYMER BEADS

Sambasiva R. Allada, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 23, 1985, Ser. No. 812,486
Int. Cl.[4] C08F 6/00
U.S. Cl. 528—483 6 Claims

1. In a method for making oversized fat imbibing, fat retaining, copolymer beads from cross linked copolymers of an ethylenically unsaturated monomer selected from the group consisting of isobornyl acrylate, isobornyl methacrylate, styrene or C_4-C_{12} alkyl styrene and at least one ester of a C_8 to C_{20} fatty alcohol and acrylic or methacrylic acid, the improvement comprising purifying beads prepared from said cross-linked copolymers and having a volume average particle diameter of from about 380 to about 2,000 microns, and a residual

monomer content of less than about 500 ppm by extracting at least 70% of the residual monomers with a gas under supercritical conditions of from about 42° C. to 50° C., at pressures of from about 1800 to about 3000 psi for a period of from 1 to about 2 hours;



whereby the beads exhibit improved resistance to hydrolytic attacks of gastric juices and intestinal lumen and contain substantially reduced amounts of residual monomers, solvents, unreacted cross linking agents, initiators, inhibiters and catalysts.

4,695,622

HEXAPEPTIDE

Evgeny I. Chazov; Vladimir N. Smirnov; Valentin A. Vinogradov; Mikhail I. Titov; Vladimir A. Penin; Alexandr K. Giorgadze; Galina P. Titova; Zhanna D. Bespalova; Boris L. Pekelis; Nikolai K. Permyakov; Sergei I. Emelyanov, and Alexandr A. Dzhikia, all of Moscow, U.S.S.R., assignors to Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR, Moscow, U.S.S.R.

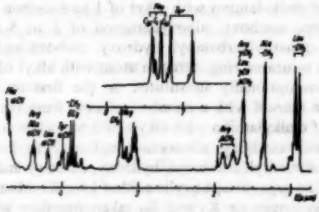
PCT No. PCT/SU85/00032, § 371 Date, Feb. 5, 1986, § 102(e) Date, Feb. 5, 1986, PCT Pub. No. WO86/00622, PCT Pub. Date Jan. 30, 1986

PCT Filed Feb. 5, 1986, Ser. No. 830,588

Claims priority, application U.S.S.R., Jul. 16, 1984, 3772995

Int. Cl.⁴ C07K 7/06

U.S. Cl. 530—329 **1 Claim**



1. A hexapeptide of the following structure:

Tyr-Ala-Gly-Phe-Leu-Arg.

4,695,623

CONSENSUS HUMAN LEUKOCYTE INTERFERON

Yitzhak Stabinsky, Boulder, Colo., assignor to Amgen, Thousand Oaks, Calif.

Division of Ser. No. 483,451, Apr. 15, 1983, which is a continuation-in-part of Ser. No. 375,494, May 6, 1982. This application Dec. 12, 1983, Ser. No. 560,495

Int. Cl.⁴ C07K *15/26, 13/00*; A61K *45/02*; C12P *21/00*

U.S. Cl. 530—351 **1 Claim**

1. A consensus human leukocyte interferon of the formula, IFN-αF.

4,695,624

COVALENTLY-MODIFIED POLYANIONIC BACTERIAL POLYSACCHARIDES, STABLE COVALENT CONJUGATES OF SUCH POLYSACCHARIDES AND IMMUNOGENIC PROTEINS WITH BIGENERIC SPACERS, AND METHODS OF PREPARING SUCH POLYSACCHARIDES AND CONJUGATES AND OF CONFIRMING COVALENCY

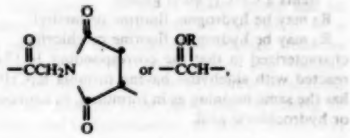
Stephen Marburg, Metuchen; Richard L. Tolman, Warren, both of N.J., and Peter J. Kniskern, Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 608,738, May 10, 1984, abandoned. This application Apr. 4, 1985, Ser. No. 719,678

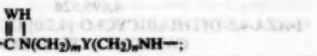
Int. Cl.⁴ C07K *15/04*; A61K *37/02, 39/02*

U.S. Cl. 530—395 **20 Claims**

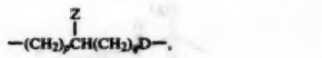
1. Stable, covalently-coupled polysaccharide-protein conjugates comprising polyanionic bacterial polysaccharides having acid groups and immunogenic proteins coupled through bigeneric spacers, containing thioether bonds, which may be represented by the formula A-E-S-B, wherein E is



where R is H or CH_3; A is

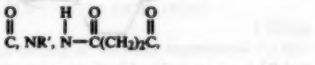


where m is 0 to 4, n is 0 to 3, W is O or NH, and Y is CH_2, O, S, NR′, or $CHCO_2H$, where R′ is H or C_1- or C_2-alkyl, such that when Y is CH_2, then both m and n are not equal to zero, and when Y is O or S, then m is 2, 3 or 4 and n is 2 or 3 and B is



where p is 1 to 3, q is 0 to 2, Z is NH_2,

CO_2H or H, and D is



where R' is as defined above.

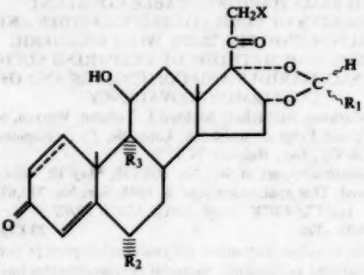
4,695,625

PROCESS FOR THE PREPARATION OF 16,17 ACETALS OF PREGNANE DERIVATIVES

Peter Macdonald, Arese, Italy, assignor to Sicor Società Italiana Corticosteroidi S.p.A., Milan, Italy

Filed May 30, 1985, Ser. No. 739,131
Claims priority, application Italy, Jun. 11, 1984, 21343 A/84
Int. Cl.[4] C07J 71/00
U.S. Cl. 540—63 11 Claims

1. A process for the preparation of 16,17-acetals of pregnane derivatives having formula I



(I)

wherein

R_1 represents a C_1–C_{12} alkyl group,

X may be OH, Cl, F or —OCOR group wherein R represents a C_1–C_{12} alkyl group;

R_2 may be hydrogen, fluorine or methyl;

R_3 may be hydrogen, fluorine or chlorine;

characterized in that the corresponding 16,17-acetonides are reacted with aldehydes having formula R_1CHO, wherein R_1 has the same meaning as in formula I, in aqueous hydrofluoric or hydrochloric acid.

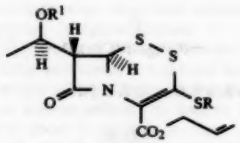
4,695,626

1-AZA-4,5-DITHIABICYCLO [4.2.0] OCT-2-EN-8-ONE-2 CARBOXYLATE ESTERS

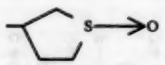
Katherine E. Brighty, Groton, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jul. 29, 1986, Ser. No. 891,493
Int. Cl.[4] C07B 513/02
U.S. Cl. 540—214 4 Claims

1. A compound of the formula



where R is (C_1–C_5)alkyl or



and R^1 is a conventional hydroxy-protecting group.

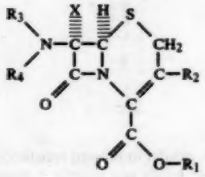
4,695,627

CEPHALOSPORIN DEOXYGENATION PROCESS

Jan Verweij, Leiden; Herman H. Grootveld, Benthuizen; Henri G. J. Hirs; Gerardus J. Van Veen, both of Zoetermeer; Jan Kalter, Hazerswoude-Dorp, and Peter W. Henniger, Leiden, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

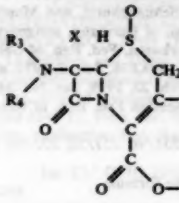
Filed Sep. 21, 1984, Ser. No. 653,866
Claims priority, application European Pat. Off., Oct. 7, 1983, 832014526
Int. Cl.[4] C07D 501/20, 501/58
U.S. Cl. 540—224 37 Claims

1. In a process for the preparation of 7 β-acylamino-3-substituted-3-cephem-4-carboxylic acid compounds of the formula



II

wherein X is selected from the group consisting of hydrogen, alkoxy of 1 to 4 carbon atoms and alkylthio of 1 to 4 carbon atoms, R_1 is a hydroxy protective group, R2 is selected from the group consisting of hydrogen, chlorine, methoxy, trifluoromethyl, vinyl, methyl, and methyl substituted by one member selected from the group consisting of: (a) halogen, (b) protected hydroxy, (c) alkoxy and alkylthio of 1 to 4 carbon atoms, (d) alkanoyloxy and alkanoylthio of 2 to 5 carbon atoms, (e) 1-pyridinium optionally substituted with at least one member of the group consisting of cyano, chloro, dialkylamino with alkyls of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkoxycarbonyl of 2 to 5 carbon atoms, dialkylcarbamoyl with alkyls of 1 to 4 carbon atoms, hydroxy, carboxy, sulfo, and alkyl of 1 to 4 carbon atoms optionally substituted on the first or second carbon atom thereof with a member selected from the group consisting of dialkylamino with alkyls of 1 to 4 carbon atoms, chloro, cyano, methoxy, alkoxycarbonyl of 2 to 5 carbon atoms, N,N-dimethylcarbamoyl, hydroxy, carboxy and sulfo, and (f) heterocyclic thio optionally substituted on ring carbons with at least one member of the group consisting of cyano, chloro, dialkylamino with alkyls of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkoxycarbonyl of 2 to 5 carbon atoms, dialkylcarbamoyl with alkyl groups of 1 to 4 carbon atoms, hydroxy, carboxy, sulfo, and alkyl of 1 to 4 carbon atoms optionally substituted on the first or second carbon atom thereof with a member selected from the group consisting of dialkylamino with alkyl of 1 to 4 carbon atoms, chloro, cyano, methoxy, alkoxycarbonyl of 2 to 5 carbon atoms, N,N-dimethylcarbamoyl, hydroxy, carboxy and sulfo, and/or on a saturated ring nitrogen atom with alkyl of 1 to 4 carbon atoms optionally substituted on the first or second carbon atom thereof with a member selected from the group consisting of dialkylamino with alkyls of 1 to 4 carbon atoms, chloro, cyano, methoxy, alkoxycarbonyl of 2 to 5 carbon atoms, N,N-dimethylcarbomoyl, hydroxy, carboxy and sulfo, R_3 is acyl of an organic carboxylic acid of 1 to 18 carbon atoms and R_4 is hydrogen or R_3 and R_4 taken together with the nitrogen atom to which they are attached form phthalimido comprising reacting at −70° C. to 0° C. in an inert organic solvent phosphorus pentachloride with a compound of the formula



I

wherein X, R_1, R_2, R_3 and R_4 have the above definition with any hydroxy, carboxy, sulfo and heterocyclic saturated amino groups contained in R_2 and R_3, optionally being protected by silylation or in the last case also by acylation, the improvement comprising effecting the reaction in the presence of an olefinic compound having at least one carbon-carbon double bond having not more than three hydrogen atoms attached thereto capable of removing chlorine at least in part by addition to a carbon-carbon double bond.

4,695,628

PREPARATION OF 6-AMINO-PENICILLANIC ACID-1,1-DIOXIDE

Jacobus J. Bos, Gouda; Rinze Cuperus, Pijnacker, and Rudolf Wielinga, De Lier, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

Filed Sep. 5, 1986, Ser. No. 904,190

Claims priority, application European Pat. Off., Sep. 6, 1985, 85201409.1

Int. Cl.[4] C07D *499/02;* A61K *31/425*

U.S. Cl. 540—312 5 Claims

1. A process for the preparation of 6-amino-penicillanic acid-1,1-dioxide, characterized in that 6-amino-penicillanic acid or 6-amino-penicillanic acid sulfoxide is oxidized with an alkali metal permanganate in an aqueous medium.

4,695,629

PROCESS FOR THE PREPARATION OF 6-METHYL-3,4-DIHYDRO-1,2,3-OXATHIAZIN-4-ONE 2,2-DIOXIDE AND ITS NON-TOXIC SALTS

Karl Clauss, Kelkheim; Adolf Linkies, Frankfurt am Main, and Dieter Reuschling, Butzbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 714,177, Mar. 20, 1985, Pat. No. 4,607,100. This application Jun. 3, 1986, Ser. No. 870,078

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1984, 3410439

Int. Cl.[4] C07D *291/06*

U.S. Cl. 544—2 5 Claims

1. A process for the preparation of 6-methyl-3,4-dihydro-1,2,3-oxathiazin-4-one 2,2-dioxide and its non-toxic salts by ring closure of an acetoacetamide derivative, which comprises using as the acetoacetamide derivative acetoacetamide-N-sulfonic acid or its salts, and carrying out the ring closure by the action of at least the approximately equimolar amount of SO_3, where appropriate in an inert inorganic or organic solvent, and then, where appropriate, also neutralizing with a base the 6-methyl3,4-dihydro-1,2,3-oxathiazin-4-one 2,2-dioxide which is produced in the form of the acid in this reaction.

4,695,630

CYCLOACETALS

Peter Haas, Haan, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

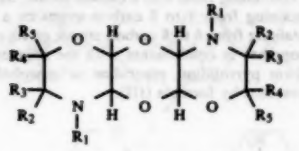
Filed Jan. 22, 1986, Ser. No. 821,569

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1985, 3504480

Int. Cl.[4] C07D *498/14*

U.S. Cl. 544—75 19 Claims

1. A polycyclic acetal of the formula



in which

R_1 is an unsubstituted alkyl or an alkyl substituted by a substituent selected from the group consisting of a halogen, a heterocyclic group, an alkoxy group and an alkylmercapto group, an unsubstituted cycloalkyl or a cycloalkyl substituted by a substituent selected from the group consisting of C_1–C_4 alkyl groups and halogen atoms, an unsubstituted aralkyl or an aralkyl substituted by a substituent selected from the group consisting of methyl, chloro, and trifluoromethyl, an unsubstituted aryl or aryl substituted by a substituent selected from the group consisting of cyano, fluoro, chloro and methyl or a heteroaryl radical and R_2, R_3, R_4 and R_5 independently of one another are hydrogen or an unsubstituted alkyl or an alkyl substituted by a substituent selected from the group consisting of a halogen, a heterocyclic group, an alkoxy group and an alkylmercapto group, an unsubstituted cycloalkyl or a cycloalkyl substituted by a substituent selected from the group consisting of C_1–C_4 alkyl groups and halogen atoms, an unsubstituted aralkyl or an aralkyl substituted by a substituent selected from the group consisting of methyl, chloro, and trifluoromethyl, an unsubstituted aryl radical or aryl radical substituted by a substituent selected from the group consisting of cyano, fluoro, chloro and methyl, or

R_3 and R_4 together form an unsubstituted C_2–C_6-alkylene radical or a C_2–C_6-alkylene radical substituted by a lower alkyl group,

R_2, R_3, R_4 and R_5 together form a fused, unsubstituted 1,2-phenylene radical or a 1,2-phenylene radical substituted by a substituent selected from the group consisting of a lower alkyl group, a halogen atom, a cyano group and a nitro group.

4,695,631

PROCESS FOR THE PREPARATION OF ENAMINES OR IMINES

Seinosuke Otsuka; Kazuhide Tani, both of Hyogo; Tsuneaki Yamagata, Osaka; Susumu Akutagawa, Kanagawa; Hidenori Kumobayashi, Kanagawa, and Misao Yagi, Kanagawa, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

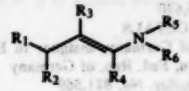
Filed Jun. 30, 1982, Ser. No. 393,982

Claims priority, application Japan, Jun. 30, 1981, 56-102039

Int. Cl.[4] C07C *87/24;* C07D *295/02*

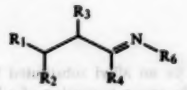
U.S. Cl. 544—170 1 Claim

1. A process for preparing an enamine represented by formula (II):



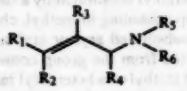
(II)

wherein R_1, R_2, R_3 and R_4 are each hydrogen, an alkyl group containing from 1 to 12 carbon atoms, an alkenyl group containing up to 12 carbon atoms, or a phenyl group, wherein R_1 may be substituted by one hydroxy group; R_5 is hydrogen, an alkyl group containing from 1 to 8 carbon atoms, or a cycloalkyl group containing from 6 to 8 carbon atoms; R_6 is an alkyl group containing from 1 to 8 carbon atoms or a cycloalkyl group containing from 6 to 8 carbon atoms; or R_5 and R_6 may combine together in combination with the adjacent nitrogen atom to form pyrrolidine, piperidine or morpholine; or an imine represented by formula (III):



(III)

wherein R_1, R_2, R_3, R_4 and R_6 are the same as for formula (II), isomerizing an allylamine derivative represented by formula (I):



(I)

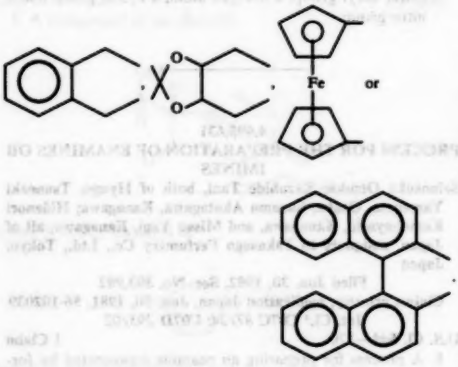
wherein R_1, R_2, R_3, R_4, R_5 and R_6 are the same as for formula (II), using as a catalyst a rhodium complex represented by formula (IV):

$$[Rh(olefin)L]^+X^-$$

wherein olefin represents ethylene, 1,3-butadiene, norbornadiene or cycloocta-1,5-diene; X represents ClO_4, BF_4 or PF_6; and L represents two triarylphosphines wherein the aryl moiety is a phenyl, a tolyl or a naphthyl group or a tri-valent phosphorous compound derivative represented by formula (V):

$$(aryl)_2—P—Y—P—(aryl)_2 \quad (V)$$

wherein the aryl moiety is a phenyl, an ortho-tolyl or a metal-tolyl group, or $(aryl)_2$ is a 2,2'-biphenyl group and Y represents $—(CH_2)_n—$, $—(CH_2)_n—$, $—(CH_2)_n—$,



4,695,632

QUATERNARY REACTIVE COMPOUNDS

Walter Kalk; Karl H. Schündehütte, and Manfred Söll, all of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

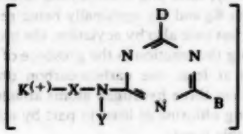
Continuation of Ser. No. 804,858, Jun. 8, 1977, abandoned. This application Feb. 23, 1979, Ser. No. 14,565

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1976, 2626959

Int. Cl.[4] C07D 251/46, 251/52, 251/18, 401/12

U.S. Cl. 544—194 10 Claims

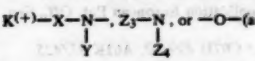
1. A compound of the formula



wherein

B is halogen, methylsulphonyl, ethylsulphonyl, or phenylsulphonyl; or also is hydrogen when D is halogen, methylsulphonyl, ethylsulphonyl, or phenylsulphonyl;

D is hydrogen, halogen, methyl, ethyl, methylsulphonyl, ethylsulphonyl, phenylsulphonyl, trifluoromethyl, C_1–C_4-alkoxy, halo-C_1–C_4-alkoxy, cyano-C_1–C_4-alkoxy, hydroxy-C_1–C_4-alkoxy, or a radical of the formula



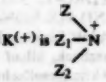
wherein

B and D are not halogen at the same time;

Z_3 and Z_4, independently of each other, are hydrogen, C_1–C_4-alkyl, hydroxy-C_1–C_4-alkyl, C_1–C_4-alkoxy-C_1–C_4-alkyl, or when joined together with N are morpholino or piperidino;

a is ethylene or propylene;

b is hydrogen, C_1–C_4-alkyl, or phenyl;



Z, Z_1 and Z_2 independently of one another are C_1–C_4-alkyl, cyclohexyl, phenyl, benzyl or phenylethyl, which are unsubstituted or substituted by 1–3 halogen, amino, hydroxy, C_1–C_4-alkoxy or C_1–C_4-alkyl;

Z and Z_1, together with N, are pyrrolidine, piperidine morpholine or piperazine, which is unsubstituted or substituted by C_1–C_4-alkyl; or Z, Z_1 and Z_2, together with N, are pyridine which is unsubstituted or substituted by C_1–C_4-alkyl,

X is C_2–C_3-alkylene, o-phenylene, m-phenylene, or p-phenylene;

Y is hydrogen or C_1–C_4-alkyl; and

$An^{(-)}$ is an anion.

4,695,633

CHROMOGENIC 4,4-DIARYL-DIHYDROQUINAZOLONES, THEIR PREPARATION AND THEIR USE

Horst Berneth, Leverkusen, and Alfred Brack, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

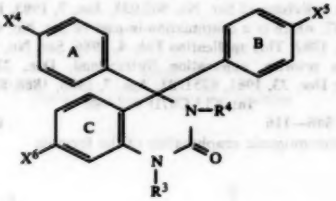
Filed May 17, 1985, Ser. No. 735,477

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1984, 3420799

Int. Cl.[4] C07D 239/82

U.S. Cl. 544—286 4 Claims

1. Chromogenic 4,4-diaryldihydroquinazolones of the formula



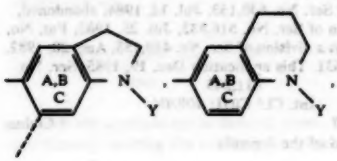
wherein

one of the radicals X^4, X^5 or X^6 represents NY^4Y^5 and the others independently of one another denote hydrogen; halogen; C_1- to C_{12}-alkyl; phenyl which is optionally substituted by chlorine and/or C_1- to C_{12}-alkyl; C_1- to C_{12}-alkanoylamino; benzoylamino which is optionally substituted by chlorine and/or C_1- to C_{12}-alkyl; NY^4Y^5, OY^6 or SY^6;

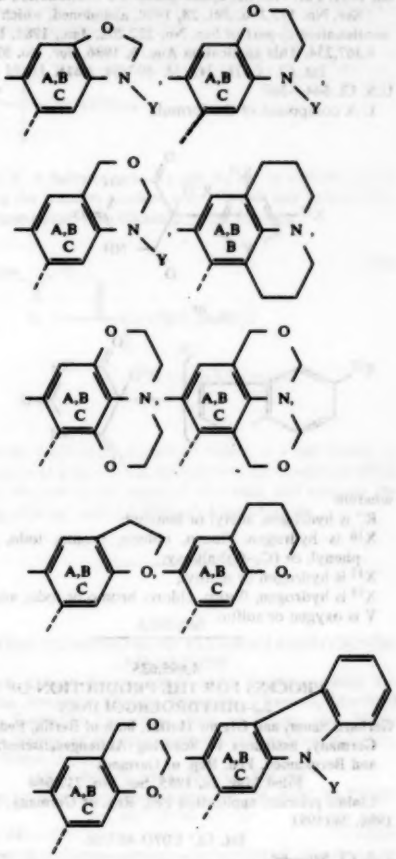
R^3 denotes hydrogen; C_1- to C_{12}-alkyl; cyclohexyl; benzyl or phenyl radicals, each of which is optionally substituted by chlorine and/or C_1–C_4-alkyl;

R^4 denotes hydrogen; C_1- to C_{30}-alkyl, which optionally carries chlorine, cyano, C_1- to C_4-alkoxycarbonyl and/or C_1- to C_4-alkoxy; cyclohexyl, which optionally carries chlorine and/or C_1- to C_4-alkyl; benzyl, which optionally carries nitro, chlorine, C_1- to C_4-alkyl and/or C_1- to C_4-alkoxy; phenyl, naphthyl, picolyl, pyridyl, pyrimidyl, pyrazinyl, triazinyl, triazolyl, thiadiazolyl, tetrazolyl, optionally benzo-fused imidazole, oxazole or thiazole radicals, each of which optionally carries chlorine, bromine, nitro, C_1- to C_4-alkyl, C_1- to C_4-alkoxy, C_1- to C_4-alkylthio, mono- or di-C_1- to C_4-dialkylamino, C_1- to C_4-alkylsulphonyl, cyano and/or C_1- to C_4-alkoxycarbonyl;

Y^4, Y^5 and Y^6 independently of one another denote C_1- to C_8-alkyl, which is optionally substituted by chlorine, cyano, C_1- to C_4-alkoxycarbonyl or C_1- to C_4-alkoxy; cyclohexyl or phenyl or benzyl, each of which is optionally substituted by chlorine, C_1- to C_4-alkyl or C_1- to C_4-alkoxy, or members which are necessary to complete together with ring A, B and C respectively to which they are attached one of the ring systems of the following formulae



-continued



wherein in the case of ring C the free bond and the broken line denote the points fused to the dihydropyrimidone ring,

Y represents hydrogen; C_1- to C_8-alkyl which is optionally substituted by chlorine, cyano, C_1- to C_4-alkoxycarbonyl or C_1- to C_4-alkoxy; cyclohexyl or phenyl or benzyl, each of which is optionally substituted by chlorine, C_1- to C_4-alkyl or C_1- to C_4-alkoxy;

the saturated ring part of the above ring systems being optionally substituted by up to 4 radicals from the group consisting of chlorine, C_1- to C_4-alkyl, C_1- to C_4-alkoxy and phenyl and the rings A, B and C are optionally substituted by chlorine, C_1- to C_4-alkyl, C_1- to C_4-alkoxy and/or C_1- to C_4-alkanoylamino; or

NY^4Y^5 denotes a pyrrolo, pyrrolidino, piperidino, pipecolino, morpholino, pyrazolo or pyrazolino radical, each of which is optionally substituted by chlorine, C_1- to C_4-alkyl or phenyl.

4,695,634
HYPOGLYCEMIC 5-SUBSTITUTED OXAZOLIDINE-2,4-DIONES

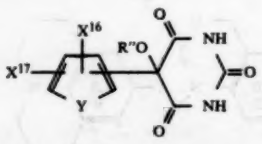
Rodney C. Schnur, Noank, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 777,109, Sep. 17, 1985, Pat. No. 4,622,406, which is a division of Ser. No. 542,241, Oct. 14, 1983, Pat. No. 4,562,267, which is a division of Ser. No. 353,777, Mar. 1, 1982, Pat. No. 4,423,233, which is a division of Ser. No. 252,961, Apr. 23, 1981, Pat. No. 4,332,952, which is a continuation-in-part of Ser. No. 173,206, Jul. 28, 1980, abandoned, which is a continuation-in-part of Ser. No. 222,202, Jan., 1981, Pat. No. 4,367,234. This application Aug. 6, 1986, Ser. No. 893,743

Int. Cl.[4] C07D *241/18, 407/04;* A61K *31/33*

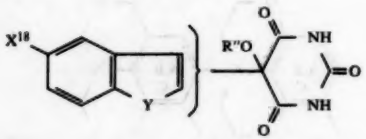
U.S. Cl. 544—300 **4 Claims**

1. A compound of the formula



(XI)

or



(XII)

wherein

R'' is hydrogen, acetyl or benzoyl;

X^{16} is hydrogen, fluoro, chloro, bromo, iodo, methyl, phenyl, or (C_1–C_3)-alkoxy;

X^{17} is hydrogen or methyl;

X^{18} is hydrogen, fluoro, chloro, bromo or iodo; and

Y is oxygen or sulfur.

4,695,635
PROCESS FOR THE PRODUCTION OF 2,3-DIHYDROERGOLINES

Gerhard Sauer, and Gregor Haffer, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

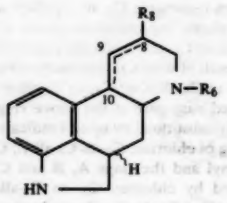
Filed Mar. 28, 1985, Ser. No. 717,064

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1984, 3411981

Int. Cl.[4] C07D *487/06*

U.S. Cl. 546—69 **17 Claims**

1. In a process for the production of a 2,3-dihydroergoline of the general formula



wherein

C_8 C_9 and C_9 C_{10} are each a C—C single or C=C double bond, but are not both a C=C double bond,

R_6 is a lower alkyl group of up to 3 carbon atoms, and

R_8 is —CH_3, —NH—CO—$N(C_2H_5)_2$ or —$COOCH_3$,

by reducing the corresponding 2-bromoergoline with sodium borohydride in trifluoroacetic acid, the improvement which comprises:

conducting the reduction step under cooling, whereby dimerization side reactions are essentially eliminated or lessened.

4,695,636
CHROMOGENIC DIHYDROFUROPYRIDINONES

Davor Bedekovic, Therwil, and Ian J. Fletcher, Magden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

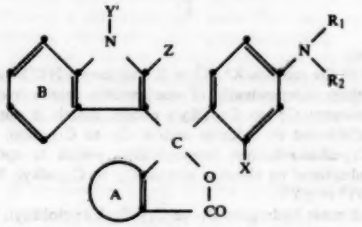
Division of Ser. No. 690,075, Jan. 9, 1985, Pat. No. 4,587,539, which is a division of Ser. No. 502,035, Jun. 7, 1983, Pat. No. 4,508,897, which is a continuation-in-part of Ser. No. 449,955, Dec. 15, 1982. This application Feb. 4, 1986, Ser. No. 826,155

Claims priority, application Switzerland, Dec. 23, 1981, 8250/81; Dec. 23, 1981, 8251/81; Apr. 7, 1983, 1868/83

Int. Cl.[4] C07D *491/048*

U.S. Cl. 546—116 **6 Claims**

1. A chromogenic azaphthalide of the formula



wherein

R1 and R2 together with the nitrogen to which they are attached are pyrrolidinyl;

X is hydrogen, halogen, lower alkyl, lower alkoxy, benzyl, phenyl, benzyloxy, phenoxy, or benzyl or benzyloxy which are substituted by halogen, nitro, lower alkyl or lower alkoxy;

Y' is C6–C9-alkyl;

Z is hydrogen, lower alkyl or phenyl; and

the ring A is a pyridine radical and

the benzene nucleus B is unsubstituted or substituted by halogen, cyano, nitro, lower alkyl, lower alkoxy, lower alkoxycarbonyl, amino, lower alkylamino or di-(lower alkyl)-amino.

4,695,637
INTERMEDIATES FOR SPIRO[2H-1,4 BENZODIOXEPIN-3(5H)4'-PIPERIDINE AND -3'-PYRROLIDINE] COMPOUNDS

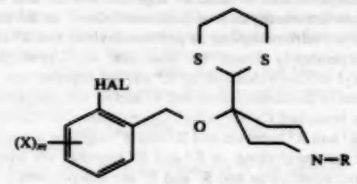
Raymond W. Kosley, Jr., Bridgewater, and Robert J. Cherill, Somerset, N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Continuation of Ser. No. 630,133, Jul. 12, 1984, abandoned, which is a division of Ser. No. 516,832, Jul. 25, 1983, Pat. No. 4,472,580, which is a division of Ser. No. 410,155, Aug. 20, 1982, Pat. No. 4,405,631. This application Dec. 19, 1985, Ser. No. 811,245

Int. Cl.[4] C07D *409/04*

U.S. Cl. 546—207 **4 Claims**

1. A compound of the formula



in which

HAL is chlorine or fluorine; X is Cl, F, or Br;
m is zero or 1; and
R is CH_3.

4,695,638

Patent Not Issued For This Number

4,695,639

THIAZOLE DERIVATIVES

Kunio Takanohashi, Kawanishi; Tsuneaki Yoshida, Osaka, and Shoichiro Fujii, Nagaokakyo, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

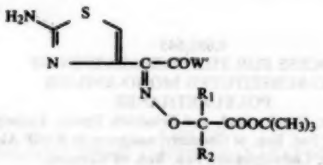
Filed Jan. 6, 1984, Ser. No. 568,921

Claims priority, application PCT Int'l Appl., Jan. 7, 1983, PCT/JP83/00003; May 2, 1983, PCT/JP83/00135

Int. Cl.⁴ C07D *277/76, 277/40*

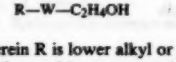
U.S. Cl. 548—165 **6 Claims**

1. A process of producing an aminothiazoleacetic acid derivative of the formula



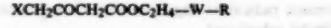
(I)

wherein R_1 and R_2 each is hydrogen or lower alkyl; and W' is hydroxyl or 2-benzothiazolylthio, or a salt thereof, which comprises reacting diketene with a halogen, reacting the resulting 4-haloacetoacetyl halide with an alcohol of the formula



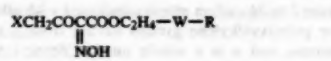
(II)

wherein R is lower alkyl or phenyl; and W is S or SO_2, reacting the resulting compound of the formula



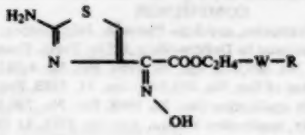
(III)

wherein X is halogen; and R and W are as as defined above, with nitrous acid, or a salt thereof, reacting the resulting compound of the formula



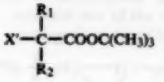
(IV)

wherein the symbols are as defined above, with thiourea or a salt thereof, reacting the resulting compound of the formula



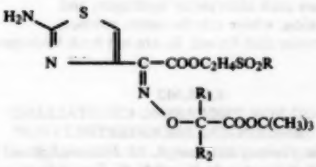
(V)

wherein the symbols are as defined above, or a salt thereof, with a compound of the formula



(VI)

wherein X' is halogen; and R_1 and R_2 are as defined above, oxidizing the reaction product when W is S, and (i) hydrolyzing the compound thus obtained of the formula



(VII)

wherein the symbols are as defined above, or a salt thereof, in the presence of a base, or (ii) hydrolyzing the compound (VII) or a salt thereof in the presence of a base, and reacting the resulting product with 2,2-dithiobis-benzothiazole.

4,695,640

ADDITION COMPOUND OF FLUORAN COMPOUNDS AND KETONE

Masakichi Yahagi, Tokyo; Tetsuo Igaki, Kawagoe; Shinji Yoshinaka, Iwatsuki; Kimiaki Kinoshita, Kitamoto; Morikuni Saito; Toshiyuki Yamashita, both of Tokyo, and Morio Nanbu, Fujimi, all of Japan, assignors to Shin Nisso Kako Co., Ltd., Tokyo, Japan

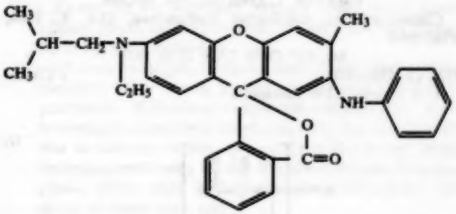
Filed Oct. 21, 1985, Ser. No. 789,950

Claims priority, application Japan, Oct. 24, 1984, 59-223460

Int. Cl.⁴ C07D *407/02*

U.S. Cl. 549—226 **1 Claim**

1. Crystals of fluoran compound consisting of 2 molecules of fluoran compound of



and 1 molecule of ketone selected from acetone and methylethyl ketone, which is obtainable by maintaining fluoran compound in the ketone at reflux temperature of the ketone for 20 minutes.

4,695,641
N-OXIRANEMETHANE N,N,N-TRIALKYLAMMONIUM COMPOUNDS

Jean Saingier, Wattrelos, and Jean-Pierre A. Joly, Golbey, both of France, assignors to Dollfus-Meig & Cie, Paris, France

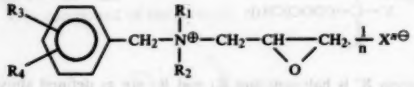
Division of Ser. No. 605,393, Apr. 30, 1984, Pat. No. 4,582,917, which is a division of Ser. No. 493,560, Apr. 11, 1983, Pat. No. 4,652,267. This application Oct. 18, 1985, Ser. No. 788,810

Claims priority, application France, Aug. 10, 1981, 81 15888; Aug. 5, 1982, 82 00131

Int. Cl.⁴ C07D *301/27*

U.S. Cl. 549—552 **2 Claims**

1. A compound of the formula:



where

R_1 is alkyl having 1 or 2 carbon atoms,

R_2 is linear alkyl having from 12 to 16, carbon atoms,

R_3 and R_4 are each chlorine or hydrogen, and

$X^{n\ominus}$ is an anion, where n is the anion valence,

with the proviso that R_3 and R_4 are not both hydrogen.

4,695,642
METHOD FOR PREPARING CRYSTALLINE ZIRCONIUM PHOSPHATES

E. G. Derouane, Namur, Belgium; R. M. Dessau, Edison, N.J.; I. J. Heilweil, Princeton, N.J., and G. T. Kerr, Lawrenceville, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 676,968, Nov. 30, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 902,121

Int. Cl.⁴ C07F *7/00*

U.S. Cl. 556—14 **42 Claims**

1. A method for preparing in an aqueous reaction mixture crystalline zirconium phosphate compounds having the composition:

$$xA:yM'_{2/m}O:ZrO_2:zP_2O_5:wH_2O$$

where A is an organic cation having a molecular weight of at least about 100; M' is a cation of valence m; $0<x<4$; $0<y<6$; $0<z<3$; and $0<w<20$, wherein a phosphorus source selected from the group consisting of water-soluble phosphates and phosphoric acid is combined with a salt of said organic cation, and thereafter combined with a source of zirconium under crystallization conditions.

4,695,643
SILANES, PROCESS FOR THEIR PREPARATION, AND THEIR USE

Konrad Oertle, and Hansjürg Wetter, both of Therwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

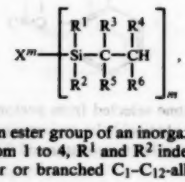
Filed Oct. 1, 1985, Ser. No. 782,349

Claims priority, application Switzerland, Oct. 4, 1984, 4765/84-0

Int. Cl.⁴ C07F *7/08, 7/10, 7/18*

U.S. Cl. 556—428 **9 Claims**

1. A compound of formula I



(I)

in which X is an ester group of an inorganic or organic acid, m is a number from 1 to 4, R^1 and R^2 independently of one another are linear or branched C_1–C_{12}-alkyl, C_5-cycloalkyl or C_6-cycloalkyl, or R^1 and R^2 together are tetramethylene or pentamethylene, and R^3 and R^5 together and R^4 and R^6 together are tetramethylene or pentamethylene; or R^3 and R^5 together are tetramethylene or pentamethylene and R^4 and R^6 are independently linear or branched C_1–C_{12}-alkyl, C_5-cycloalkyl or C_6-cycloalkyl; or R^4 and R^6 together are tetramethylene or pentamethylene and R^3 and R^5 are independently linear or branched C_1–C_{12}-alkyl, C_5-cycloalkyl or C_6-cycloalkyl; or R^3 and R^4 together and R^5 and R^6 together are trimethylene or tetramethylene; or R^3 and R^4 together are trimethylene or tetramethylene and R^5 and R^6 are independently linear or branched C_1–C_{12}-alkyl, C_5-cycloalkyl or C_6-cycloalkyl.

4,695,644
PROCESS FOR PRODUCING PHENYL CHLOROTHIOFORMATES

Kenji Tsuzuki, and Takeshi Uotani, both of Yamaguchi, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Tamaguchi, Japan

Filed May 14, 1986, Ser. No. 862,923

Claims priority, application Japan, May 14, 1985, 60-100553; May 22, 1985, 60-108290

Int. Cl.⁴ C07C *68/00*

U.S. Cl. 558—249 **8 Claims**

1. A process for producing a phenyl chlorothioformate, which comprises (1) allowing sulfur dioxide to react with a mixed solution consisting of perchloromethyl mercaptan, an organic solvent and water, (2) removing the water layer from the reaction mixture and (3) adding to the remaining organic layer a phenol compound or condensed phenol and a dehydrohalogenating agent in that order.

4,695,645
PROCESS FOR THE PREPARATION OF N,O-SUBSTITUTED MONO-AND/OR POLYURETHANES

Franz Merger, Frankenthal, and Friedrich Towae, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 20, 1984, Ser. No. 632,840

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1983, 3327824

Int. Cl.⁴ C07C *125/065*

U.S. Cl. 560—24 **9 Claims**

1. A process for the preparation of N,o-substituted mono- and/or polyurethanes of the formula

$$R^1[-NHCOOR^2]_n$$

in which

R^1 is an aromatic radical having from 6 to 15 carbon atoms which may be substituted,

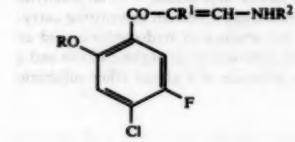
R^2 is selected from the group consisting of an alkyl radical having from 1 to 18 carbon atoms, a cycloalkyl radical having from 4 to 12 carbon atoms, an aralkyl radical having from 7 to 15 carbon atoms and an alkyl radical having from 2 to 24 carbon atoms substituted with alkoxy groups or polyoxyalkylene groups having from 1 to 4 carbon atoms, and n is a whole number from 1 to 5 wherein N-substituted allophanic acid and/or polyallophanate is reacted with alcohols in the presence or absence of catalysts at temperatures of at least 160° C.

4,695,646
AMINOACRYLIC ACID DERIVATIVES

Fritz Maurer, Wuppertal, and Klaus Grohe, Odenthal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

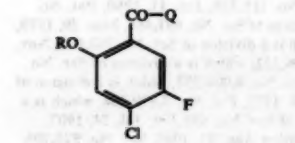
Filed Jan. 6, 1986, Ser. No. 816,544
Claims priority, application Fed. Rep. of Germany, Jan. 16, 1985, 3501247
Int. Cl.[4] C07C 101/78, 69/738
U.S. Cl. 560—43 6 Claims

1. An aminoacrylic acid derivative of the formula



in which
R is alkyl,
R^1 is alkoxycarbonyl, and
R^2 is C_3-C_6-cycloalkyl.

4. A compound of the formula



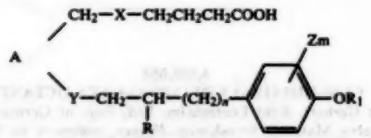
in which
Q is $—CR^1=CHR^3$ or $—CH_2COOR^4$,
R is alkyl,
R^1 is alkoxycarbonyl,
R^3 is alkoxy, and
R^4 is alkyl.

4,695,647
AROMATIC DERIVATIVES OF 13-AZAPROSTANOIC ACID

Thomas D. Eller, Mt. Pleasant; Perry V. Halushka; Daniel R. Knapp, both of Charleston, and Dale Mais, Goose Creek, all of S.C., assignors to Drug Science Foundation, Charleston, S.C.

Filed Mar. 22, 1984, Ser. No. 592,074
Int. Cl.[4] C07C 177/00
U.S. Cl. 560—53 11 Claims

1. Radioactive compounds of the formula:



and their pharmaceutically acceptable esters and salts, wherein:
R is H or OH;
R_1 is H or lower alkyl;
X is $—CH_2—CH_2—$ or cis $—CH=CH—$;
Y is $—CH_2—$,

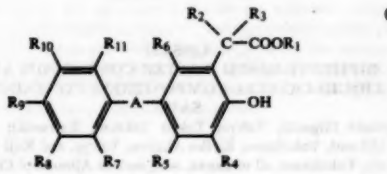
—O— or —S—;
n is 0 or 1;
m is 1 or 2;
Z is radioactive iodine; and
A is
(i) an eicosanoid nucleus;
(ii) a carbocyclic analog of an eiconsanoid nucleus; or
(iii) a heterocyclic analog of an eicosanoid nucleus wherein one of the carbons in one of said carbocycliic analogs is replaced by O, S or N.

4,695,648
NOVEL ARYLACETIC ACID DERIVATIVES

Karl H. Agback; Tamara Agback, both of Upsala, and Alf S. Nygren, Örbyhus, all of Sweden, assignors to Pharmacia AB, Upsala, Sweden

PCT No. PCT/SE85/00020, § 371 Date Aug. 29, 1985, § 102(e) Date Aug. 29, 1985, PCT Pub. No. WO85/03287, PCT Pub. Date Aug. 1, 1985
PCT Filed Jan. 18, 1985, Ser. No. 775,058
Claims priority, application Sweden, Jan. 19, 1984, 8400239
Int. Cl.[4] C07C 69/76
U.S. Cl. 560—053 11 Claims

1. An arylacetic acid derivative having the structure



(I)

in which
R_1 and R_2 are hydrogen or lower alkyl, preferably R_2 is hydrogen;
R_3 is hydrogen, lower alkyl or;
R_4, R_5 and R_6 are hydrogen, halogen, lower alkyl, lower alkoxy, cyano, carboxy or nitro; at least one of the groups R_4 to R_6 being hydrogen;
R_7 to R_{11} are hydrogen, halogen, cyano, lower alkyl, trifluoromethyl, lower alkoxy, hydroxy, lower acyl, lower alkxycarbonyl, N,N,-diloweralkylaminocarbonyl or N,N-loweralkylene-aminocarbonyl; and R_8 to R_{10} may in addition be carboxy; at least two of R_7 to R_{11} always being hydrogen; preferably R_7 and R_{11} are hydrogen, halogen, cyano, lower alkyl, trifluoromethyl, lower alkoxy, hydroxy or lower acyl; and
—A— is —CO—, $—CH_2—CO—$, —CH=CH—, —CH=CH—CO— or corresponding groups in which a hydrogen atom is replaced by a lower alkyl group; or salts thereof in cases where the compound comprises at least one carboxy group; or corresponding lactones in cases where R_1 is H.

4,695,649

PHTHALATE COMPOUNDS

Masato Magami; Kazumi Saeki, both of Nakatsu; Takanori Miura, Chikujo, and Takeshi Inoue, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP85/00208, § 371 Date Jun. 12, 1985, § 102(e) Date Jun. 12, 1985, PCT Pub. No. WO85/04869, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 16, 1985, Ser. No. 748,450

Claims priority, application Japan, Apr. 19, 1984, 59-78907

Int. Cl.[4] C07C *69/80*

U.S. Cl. 560—86 1 Claim

1. Di(p-benzyloxycarbonylphenyl)isophthalate.

4,695,650

LIQUID CRYSTAL COMPOUNDS AND COMPOSITIONS CONTAINING SAME

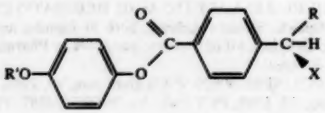
David M. Walba, and Homaune A. Razavi, both of Boulder, Colo., assignors to University of Colorado Foundation, Boulder, Colo.

Filed Sep. 24, 1986, Ser. No. 911,096

Int. Cl.[4] C07C *69/76;* C09K *19/20*

U.S. Cl. 560—109 6 Claims

1. A compound of the formula:



wherein R is an alkyl group containing three to twelve carbon atoms, R' is an alkyl group containing five to twelve carbon atoms and X is selected from the group consisting of chlorine and fluorine.

4,695,651

BIPHENYL-BASED DIESTER COMPOUNDS AND LIQUID CRYSTAL COMPOSITIONS CONTAINING SAME

Ryoichi Higuchi, Tokyo; Takao Sakurai, Kawasaki; Naoko Mikami, Yokohama; Kiriko Akaiwa, Tokyo, and Koji Takeuchi, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

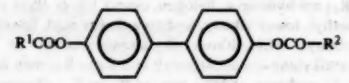
Filed Sep. 10, 1985, Ser. No. 774,484

Claims priority, application Japan, Sep. 10, 1984, 59-189232; Feb. 8, 1985, 60-22920

Int. Cl.[4] C09K *19/12, 19/52;* G02F *1/13;* C07C *69/353*

U.S. Cl. 560—141 4 Claims

1. A smectic liquid crystal compound of the formula



wherein R^1 represents a C_{1-18} alkyl group, R^2 represents

wherein R^3 represents a C_{1-16} alkyl group and the carbon atom marked by (*) is an asymmetric carbon atom.

4,695,652

PROCESS FOR THE PREPARATION OF β-AMINOETHYL KETONES

Florin Seng, Bergisch-Gladbach, and Josef Bremen, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 2, 1985, Ser. No. 783,462

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1984, 3436450

Int. Cl.[4] C07C *97/10, 85/18*

U.S. Cl. 564—343 6 Claims

1. In a process for the preparation of a β-aminoethyl ketone by the condensation of a methyl aryl ketone with an aldehyde and ammonia or an amine, the improvement comprising carrying out the reaction in the absence of hydrochloric acid or hydrochlorides and in the presence of an organic nitrile and a sulphonic acid or in the presence of a glycol ether sulphuric acid.

4,695,653

CATIONIC SURFACE-ACTIVE AGENTS

Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Mitry-Mory, both of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 111,326, Jan. 11, 1980, Pat. No. 4,436,909, which is a division of Ser. No. 891,455, Mar. 29, 1978, Pat. No. 4,220,602, which is a division of Ser. No. 742,671, Nov. 17, 1976, Pat. No. 4,096,332, which is a division of Ser. No. 547,465, Feb. 6, 1975, Pat. No. 4,009,253, which is a division of Ser. No. 187,151, Oct. 6, 1971, Pat. No. 3,879,464, which is a continuation-in-part of Ser. No. 655,336, Jul. 24, 1907, abandoned. This application Aug. 23, 1983, Ser. No. 525,705

Claims priority, application Luxembourg, Jul. 26, 1966, 51645; May 12, 1967, 53667

Int. Cl.[4] C07C *91/10;* C07D *295/08*

U.S. Cl. 564—505 6 Claims

1. A cationic surface-active agent comprising a mixture of compounds having the formula

wherein R' is selected from the group consisting of alkyl having 12–20 carbon atoms and alkenyl having 12–20 carbon atoms, R'' is selected from the group consisting of methyl and ethyl, m has a statistical average value of 2–6, R_1 and R_2 each independently are selected from the group consisting of lower alkyl having 1–4 carbon atoms and hydroxy lower alkyl having 1–4 carbon atoms and n has a statistical average value of 0.5–4.

4,695,654

GEM-DIHALO-1,8-DIAMINO-4-AZA-OCTANES

Fritz Gerhart, Kehl Leutesheim, Fed. Rep. of Germany, and Pierre Mamont, Strasbourg, France, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Aug. 21, 1985, Ser. No. 767,928

Int. Cl.[4] C07C *87/22*

U.S. Cl. 564—510 6 Claims

1. A gem-dihalo-1,8-diamino-4-aza-octane derivative of spermidine wherein the gem-dihalo moiety is located at one of the 2,2-, 6,6- or the 7,7-positions thereof.

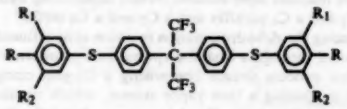
4,695,655

ETHYNYLTHIOPHENOXY DERIVATIVES OF DIPHENYLHEXAFLUOROPROPANE

Kreisler S. Y. Lau, Alhambra, and William J. Kelleghan, Whittier, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 4, 1984, Ser. No. 647,000
Int. Cl.[4] C07C 149/34
U.S. Cl. 568—56 2 Claims

1. A diphenylhexafluoropropane compound having the formula:



where R, R_1 and R_2 are hydrogen or ethynyl.

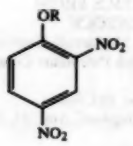
4,695,656

PROCESS FOR THE PREPARATION OF 2,4-DINITROPHENYL ETHERS

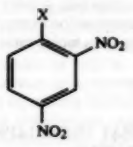
Kuno Reh, and Friedrich Schophoff, both of Frankfurt am Main, Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 31, 1986, Ser. No. 846,011
Claims priority, application Fed. Rep. of Germany, Apr. 27, 1985, 3515339
Int. Cl.[4] C07C 43/025; C07D 307/02
U.S. Cl. 568—587 12 Claims

1. In the improved process for the preparation of 2,4-dinitrophenyl ethers of the formula



wherein R is (C_1–C_4)alkoxy-(C_2–C_4)alkyl, phenoxy-(C_2–C_4)alkyl, (C_1–C_4)alkoxy-(C_2–C_4)alkoxy-(C_2–C_4)alkyl or tetrahydrofurfuryl, wherein 2,4-dinitrohalobenzene of the formula



is reacted with an alkali metal alcoholate of the formula

ROM

wherein X is —Cl or —Br and M is an alkali metal cation, the improvement comprises reacting the dinitrohalobenzene and alkali metal alcoholate at a temperature of −25° C. to 50° C. in a non-polar, inert solvent.

4,695,657

PROCESS FOR PREPARING COMPOUNDS CONTAINING A DIFLUOROMETHYLENE GROUP IN A POSITION α TO AN OXYGEN ATOM

Michel Desbois, Rilleux, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Dec. 17, 1985, Ser. No. 809,721
Claims priority, application France, Dec. 26, 1984, 84 19798
Int. Cl.[4] C07C 43/02, 43/18, 69/63, 69/62
U.S. Cl. 568—656 8 Claims

1. A process for the preparation of an ether compound containing a difluoromethyleneoxy group by simultaneous esterification and fluorination, comprising the step of contacting an alcohol or a phenol with a carbonyl-containing compound selected from the group consisting of trifluoroacetic acid, halides of trifluoroacetic acid and the anhydride of trifluoroacetic acid, in anhydrous liquid hydrofluoric acid, in the presence of boron trifluoride in a quantity such that the absolute of boron trifluoride is at leats about one bar for a time sufficient to create said difluoromethyleneoxy group.

4,695,658

ARYL CARBOXYLATE PROCESS

Edward C. Taylor, Princeton; Alan H. Katz, Cranbury; Randy A. Bull, Hopewell; Lance R. Byers, Hightstown, and Richard A. Brown, Trenton, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Filed Mar. 12, 1984, Ser. No. 589,257
Int. Cl.[4] C07C 39/10, 69/76
U.S. Cl. 568—763 15 Claims

1. The process of replacing a carbon-thallium bond of an arylthallium compound with a carbon-oxygen bond comprising:

a. forming a nonaqueous solution containing the arylthallium compound, a nitrile, a carboxylic acid or salt thereof, and an acid in an amount sufficient to maintain an excess of free acid in the solution, and

b. adding to the nonaqueous solution a cuprous copper compound which is capable of forming a soluble carboxylate salt therein, and which serves to promote the replacement of the thallium moiety with the carboxylate moiety to form substantially only an arylcarboxylate ester of the corresponding arylthallium compound.

4,695,659

METHOD FOR DEALKYLATION OF ALKYL-ARYL ETHERS

Sven-Göran B. Andersson, Malmö, Sweden, assignor to Caemical Dynamics Development AB, Skara, Sweden

PCT No. PCT/SE85/00399, § 371 Date Jun. 20, 1986, § 102(e) Date Jun. 20, 1986, PCT Pub. No. WO86/02634, PCT Pub. Date May 9, 1986
PCT Filed Oct. 17, 1985, Ser. No. 881,027
Claims priority, application Sweden, Oct. 22, 1984, 8405262
Int. Cl.[4] C07C 37/00, 37/055
U.S. Cl. 568—805 9 Claims

1. In a process for the dealkylation of an alkyl aryl ether by reaction with aluminum triodide under reflux, the improvement comprising conducting said reaction in the presence of a catalytic amount of a quaternary ammonium iodide in a substantially non-aqueous organic solvent, and hydrolyzing the reaction product with water, whereby reaction time is shortened and reaction yield is increased.

4,695,660

METHOD OF PRODUCING CYCLOHEXYL COMPOUNDS

Werner Otte, Dorsten, and Rudolf Nehring, Marl, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Jul. 24, 1986, Ser. No. 888,711

Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537228

Int. Cl.[4] C07C *29/132, 29/136*

U.S. Cl. 568—830 6 Claims

1. A method for producing 1-cyclohexyl-ethanol by catalytic hydrogenation of acetophone, comprising:

hydrogenating said acetophenone in the presence of a catalyst consisting essentially of Ru and a support, at a hydrogen pressure of about 200–350 bar and a temperature of from about 80°–160° C. and

wherein said acetophenone is in a slurry or a tricking liquid phase.

4,695,661

CATALYTIC SYSTEM AND A PROCESS FOR PREPARING ALPHA, OMEGA-C_4 THROUGH C_{20} ALKENOLS

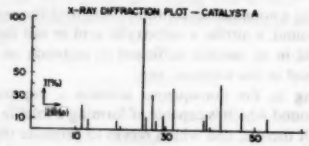
Walter K. Homann, Duelmen, and Lothar Fischer, Marl, both of Fed. Rep. of Germany, assignors to Huls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Mar. 19, 1986, Ser. No. 841,490

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1985, 3510568

Int. Cl.[4] C07C *29/60, 33/025*

U.S. Cl. 568—903 14 Claims



1. A method for preparing pure alpha, omega-C_4 to C_{20} alkenols having purities in excess of 90% by the catalytic dehydration of the corresponding alpha, omega-C_4 to C_{20} diols, comprising:

(a) reacting an alkaline earth metal compound with phosphoric acid in a paste and forming an alkaline earth metal phosphate reaction product;

(b) doping said reaction product by adding 2 to 25% by weight of a diphosphate doping compound selected from the group consisting of alkali metal diphosphate and alkaline earth metal diphosphate and forming an alkaline earth metal phosphate reaction product doped with a diphosphate doping compound wherein the percent by weight of said diphosphate doping compound is calculated as metal oxide and referred to the weight of said phosphate reaction product also calculated as metal oxide;

(c) drying and extruding said phosphate reaction product doped with a diphosphate doping compound and forming a dried and extruded substance;

(d) calcining said dried and extruded substance at temperatures between 350° to 950° C. to form a catalyst free of diphosphate compound; and

(e) dehydrating said diols by passing them over said catalyst at temperatures between 300° to 500° C. to form said alkenols having purities in excess of 90% at conversions in excess of 90%.

4,695,662

LIGHT PARAFFIN DEHYDROGENATION PROCESS

Bipin V. Vora, Elk Grove Village, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Apr. 4, 1986, Ser. No. 848,354

Int. Cl.[4] C07C *5/03, 7/11*

U.S. Cl. 585—324 9 Claims

1. A hydrocarbon conversion process, which process comprises the steps of:

(a) passing a feed stream comprising a C_4 paraffin into a catalytic dehydrogenation reaction zone maintained at dehydrogenation conditions and producing a dehydrogenation reaction zone effluent stream comprising hydrogen, a C_3 and a C_4 paraffin and a C_3 and a C_4 olefin;

(b) passing the dehydrogenation reaction zone effluent stram upward through a first absorption zone countercurrent to a first process stream comprising a C_5-plus compound, and producing a lean vapor stream, which stream comprises hydrogen, the C_5-plus compound and the C_3 olefin, and a first rich liquid stream comprising the C_5-plus compound, C_3 and C_4 paraffins and C_3 and C_4 olefins;

(c) passing the lean vapor stream upward through a second absorption zone countercurrent to a second process stream which comprises a C_3–C_4 paraffin, and producing a hydrogen-rich gas stream, which stream comprises hydrogen and a C_3–C_4 paraffin, and a second rich liquid stream which comprises the C_5-plus compound and the C_3 olefins;

(d) recycling at least a portion of the hydrogen-rich gas stream to the catalytic dehydrogenation reaction zone;

(e) passing the first and the second rich liquid streams into a fractionation zone and separating the first and the second rich liquid streams into at least a first net overhead stream comprising propane, and a third process stream comprising a C_4 olefin and a C_4 paraffin; and,

(f) passing at least a portion of the third process stream into a catalytic etherification zone wherein at least a portion of the C_4 olefin is consumed by reaction with methanol in the creation of a C_5-plus ether, and producing an effluent stream comprising the C_4 paraffin and a product stream comprising the C_5-plus ether.

4,695,663

PRODUCTION OF AROMATICS FROM HYDROCARBON FEEDSTOCK

Antony H. P. Hall, Cobham, and John J. McCarroll, Camberley, both of England, assignors to The British Petroleum Company p.l.c., London, England

Filed Jul. 30, 1986, Ser. No. 891,740

Claims priority, application United Kingdom, Aug. 21, 1985, 8520977

Int. Cl.[4] C07C *2/00*

U.S. Cl. 585—417 10 Claims

1. A process for producing liquids rich in aromatic hydrocarbons comprising bringing into contact in the vapour phase and in the absence of oxygen at a temperature between 650° C. and 800° C. a hydrocarbon feedstock containing greater than 50% w/w of methane with a catalyst composition comprising an aluminosilicate having silica to alumina in a molar ratio of at least 5:1.

4,695,664

METHOD OF RECOVERING HEAT FROM LOW TEMPERATURE EFFLUENT

Leslie F. Whittle, Windham, N.H., assignor to The Badger Company, Inc., Cambridge, Mass.

Filed Apr. 17, 1986, Ser. No. 853,043

Int. Cl.[4] C07C *4/02*

U.S. Cl. 585—440 18 Claims

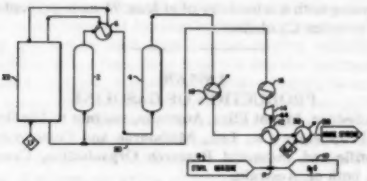
1. A process for the dehydrogenation of an alkylaromatic hydrocarbon which comprises the steps of:

(a) continuously contacting a reactant vapor stream com-

prising an alkylaromatic hydrocarbon and steam with a dehydrogenation catalyst in a reactor under dehydrogenation conditions so as to form a vapor phase dehydrogenation reaction effluent comprising a predetermined product hydrocarbon;

(b) continuously removing said effluent as a stream from said reactor;

(c) continuously mixing an alkylaromatic hydrocarbon and water in liquid form so as to form an azeotropic feed mixture;



(d) cooling said effluent stream without any significant condensation of said predetermined product hydrocarbon by indirect heat exchange with a selected fluid cooling medium;

(e) recovering additional heat from said effluent stream by indirect heat exchange with said azeotropic feed mixture so as to cause vaporization of said alkylaromatic hydrocarbon and water; and

(f) feeding said vaporized alkylaromatic hydrocarbon and water to said reactor as said reactant vapor stream.

4,695,665

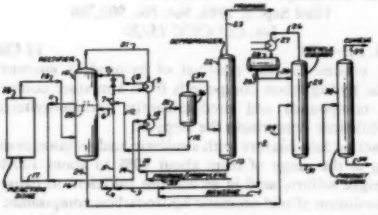
PROCESS FOR ALKYLATION OF HYDROCARBONS

Richard R. De Graff, Deerfield, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jul. 2, 1986, Ser. No. 881,536

Int. Cl.⁴ C07C 3/54, 7/04

U.S. Cl. 585—450 **14 Claims**



1. A fixed-bed hydrocarbon alkylation process which comprises the steps of:

(a) passing a reaction zone effluent stream comprising a volatile light hydrocarbon and less volatile feed and product hydrocarbons into a lower portion of a rectified separation zone operated at conditions effective to separate the entering hydrocarbons into an overhead vapor stream which is rich in the light hydrocarbon and a bottoms stream comprising the feed and product hydrocarbons;

(b) separating the bottoms stream in a fractionation zone into a liquid-phase recycle stream which is rich in the feed hydrocarbon and a product stream which is rich in the product hydrocarbon, and withdrawing the product stream from the process;

(c) passing a portion of the recycle stream into a contact-exchanger located in an upper portion of the rectified separation zone and which receives a rectified vapor stream comprising the volatile light hydrocarbon and the feed hydrocarbon from the lower portion of the rectified separation zone, removing heat and the feed hydrocarbon from the rectifier vapor stream by direct contact and producing said overhead vapor stream and a rectifier exchanger liquid stream which is withdrawn from the rectified separation zone at a point above the lower portion of the rectified separation zone and below the contact-exchanger; and,

(d) passing the rectifier exchanger liquid stream and a feed stream comprising the volatile light hydrocarbon into a reaction zone maintained at reaction conditions and producing the reaction zone effluent stream.

4,695,666

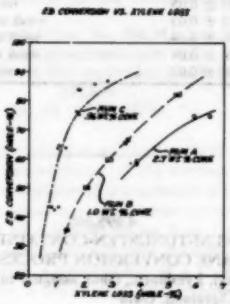
PHOSPHORUS-CONTAINING ALUMINA CATALYST FOR THE ISOMERIZATION OF AROMATICS

Tai-Hsiang Chao, Mt. Prospect, and J. W. Adriaan Sachtler, Des Plaines, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 871,968, Jun. 9, 1986, Pat. No. 4,654,455, which is a division of Ser. No. 806,984, Dec. 9, 1985, Pat. No. 4,636,483. This application Dec. 22, 1986, Ser. No. 944,910

Int. Cl.⁴ C07C 5/22

U.S. Cl. 585—481 **10 Claims**



1. A process for isomerizing isomerizable alkylaromatic hydrocarbons which comprises contacting the alkylaromatic hydrocarbons in a reaction zone at isomerization reaction conditions with a catalytic composition comprising phosphorus-containing alumina, a gallium component, and crystalline aluminosilicate zeolite having a silica to alumina ratio of at least 12.

4,695,667

NOVEL CRYSTALLINE ALUMINOSILICATE ZEOLITES AND PROCESS FOR PRODUCTION THEREOF

Koji Sumitani; Tokuji Sakai; Yasuo Yamasaki, and Tamio Onodera, all of Matsuyama, Japan, assignors to Teijin Petrochemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 634,449, Jul. 25, 1984, which is a division of Ser. No. 317,918, Nov. 3, 1981, abandoned. This application Feb. 26, 1985, Ser. No. 705,631

Claims priority, application Japan, Nov. 4, 1980, 55-155017; Mar. 6, 1981, 56-31182; Jun. 10, 1981, 56-88024; Jul. 20, 1981, 56-112264

Int. Cl.⁴ C07C 5/27

U.S. Cl. 585—481 **12 Claims**

1. In a process for isomerizing xylenes and ethylbenzene which comprises contacting an aromatic hydrocarbon stock mainly containing xylene isomers and ethylbenzene, in which the concentration of at least one xylene isomer is lower than the thermodynamical equilibrium concentration with a catalyst composition at an elevated temperature in the vapor phase in the presence of hydrogen, the improvement which comprises using as the catalyst composition a catalyst composition containing as catalytically active components

(A) alumina having deposited thereon platinum or its oxide, and

(B) a crystalline aluminosilicate zeolite characterized by having a composition of the following general formula expressed in terms of the mole ratios of oxides in the anhydrous state

$$xM_{2/n}O.Al_2O_3.ySiO_2 \quad (I)$$

where M represents at least one cation having a valence of n selected from the group consisting of a hydrogen ion and metal cations of metals of Group IA, IIA and IIIB of the periodic table, x is a number between 0.5 and 4, and y is a number of at least 10, and having an X-ray diffraction pattern showing at least the following significant peaks

Interplanar spacing d(Å)	Relative intensity
11.2 ± 0.5	medium to strong
9.9 ± 0.5	medium to strong
4.67 ± 0.1	medium
4.33 ± 0.1	very strong
4.02 ± 0.05	strong to very strong
3.83 ± 0.05	medium
3.72 ± 0.05	weak to medium
3.44 ± 0.04	weak to strong
3.33 ± 0.04	weak to strong
3.28 ± 0.03	medium

4,695,668

MOLYBDENUM-TUNGSTEN-CONTAINING CATALYST AND METHANE CONVERSION PROCESS USING SAME

Louis J. Velenyi, Lyndhurst, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Mar. 24, 1986, Ser. No. 843,095
Int. Cl.[4] C07C *2/00*
U.S. Cl. 585—500 **31 Claims**

1. A process for converting methane to at least one higher order hydrocarbon comprising contacting a gaseous reactant comprising methane and oxygen with a molybdenum-tungsten-containing catalyst under reaction conditions for an effective period of time to form said higher order hydrocarbon, said catalyst comprising a molybdenum-tungsten-containing complex represented by the formula

$$Mo_aW_bM_cA_dO_e$$

wherein M is selected from the group consisting of one or more metals selected from any of Groups IB, IIB, IVB, VB or VIII of the Periodic Table and/or one or more of Y, Cr, Mn, Re, B, In, Ge, Sn, Pb, Th or U, or a mixture of two or more of the metals in said group;

A is at least one metal selected from the group consisting of alkali metals, alkaline earth metals, Lanthanide series metals, La, Tl, or a mixture of two or more of the metals in said group;

a is a number in the range of from about 1 to about 200;

b is a number in the range of from about 1 to about 200;

with the proviso that either Mo or W is in excess of the other, the ratio of a:b being about 4:1 or greater, or about 1:4 or less;

c is a number such that the ratio of c:(a+b) is in the range of from 0:100 to about 10:100;

d is a number such that the ratio of d:(a+b) is in the range of from 0:100 to about 75:100; and

e is the number of oxygens needed to fulfill the valence requirements of the other elements.

4,695,669

PROCESS FOR PROPYLENE DIMERIZATION

James C. Stevens, and William A. Fordyce, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 2, 1986, Ser. No. 902,740
Int. Cl.[4] C07C *2/10, 2/26*
U.S. Cl. 585—511 **20 Claims**

1. A process for the preparation of 4-methyl-1-pentene, the process comprising contacting propylene and a catalyst comprising uranium under reaction conditions to produce 4-methyl-1-pentene with a selectivity of at least 94 mole percent with respect to other C_6 olefins.

4,695,670

PRODUCTION OF GASOLINE

Duncan Seddon, Mount Eliza, Australia, assignor to The Broken Hill Proprietary Co., Ltd., Melbourne and Commonwealth Scientific and Industrial Research Organisation, Campbell ACT, both of, Australia

Continuation of Ser. No. 715,381, Mar. 25, 1985, abandoned. This application Apr. 2, 1986, Ser. No. 847,242
Claims priority, application Australia, Mar. 27, 1984, PG4265
Int. Cl.[4] C07C *2/02*
U.S. Cl. 585—533 **8 Claims**

1. Process for conversion of a light olefinic feed stock into gasoline by contact with a zeolite catalyst, characterized in that the catalyst has not been subjected to ion exchange, contains at least 0.5% by weight of a Group IA metal oxide, and has an X-ray powder diffraction pattern (Co radiation) exhibiting the presence of ZSM-5 zeolite and characterized by a peak in the region $2\theta = 27.0 \pm 0.2$ degrees which is greater in intensity than peaks at both $2\theta = 9.20 \pm 0.2$ and $2\theta = 10.25 \pm 0.2$ degrees.

4,695,671

TETRAMETHYLTETRAHYDRONAPHTHALENE PURIFICATION PROCESS

Raymond L. Cobb, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sep. 2, 1986, Ser. No. 902,786
Int. Cl.[4] C07C *15/20*
U.S. Cl. 585—858 **12 Claims**

1. A process for the removal of by-product amounts of aromatic hydrocarbon compounds from a mixture comprised of aid compounds and predominantly tetramethyltetrahydronaphthalene comprising the steps of:

contacting said mixture with a sulfuric acid solution containing in the range of from about 90% to about 100% by weight sulfuric acid in an amount sufficient to cause the dissolution of said aromatic hydrocarbon compounds; and

separating the resulting acid phase containing said aromatic hydrocarbon compounds from said mixture.

4,695,672

PROCESS FOR EXTRACTIVE-STRIPPING OF LEAN HYDROCARBON GAS STREAMS AT HIGH PRESSURE WITH A PREFERENTIAL PHYSICAL SOLVENT

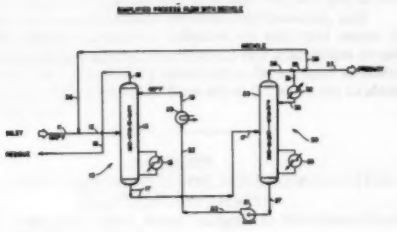
Terry N. Bunting, Odessa, Tex., assignor to Advanced Extraction Technologies, Inc., Houston, Tex.

Filed Apr. 21, 1986, Ser. No. 854,384
Int. Cl.[4] F25J *1/02*
U.S. Cl. 585—867 **18 Claims**

1. In a process for selectively extracting hydrocarbons from a hydrocarbon gas feed stream with a preferential physical solvent which provides selective capability for extremely high recoveries according to any selected degree of a selected hydrocarbon component and heavier hydrocarbons within the group consisting of ethane, propane, butane, and pentane without the need simultaneously to recover hydrocarbons lighter than said selected hydrocarbon component from said hydrocarbon gas feed stream, said recoveries being: (a) ethane in

amounts within the range of 2–100%, (b) propane in amounts within the range of 2–100%, (c) butane in amounts within the range of 2–100%, or (d) pentanes and higher molecular weight hydrocarbons in amounts ranging up to 100% by the following steps:

(a) selectively extracting and stripping said hydrocarbon gas feed stream with said physical solvent to produce a residue hydrocarbon gas stream of pipeline specifications and a rich solvent stream containing ethane and heavier hydrocarbon components, whereby said rich solvent stream consists essentially of only economically desired hydrocarbons, said preferential physical solvent being selective for said ethane and heavier hydrocarbon components of the gas stream such that: (1) the relative volatility of methane over ethane is at least 5.0 and the hydrocarbon loading capacity, defined as solubility of ethane in solvent, is at least 0.25 standard cubic feet of ethane per gallon of solvent, or (2) the preferential factor determined by the multiplication of relative volatility of methane over ethane by the solubility of ethane in solvent, in standard cubic feet of ethane per gallon of solvent, is at least 1.25; and



(b) distilling said rich solvent to produce: (1) said selected hydrocarbon component and heavier hydrocarbons as overhead product, the amount of each recovered hydrocarbon component that is lower in molecular weight than said selected hydrocarbon component being less than the recovered amount of said selected hydrocarbon component, and (2) said physical solvent as bottoms for feeding to said extracting and stripping step,

wherein the need exists to avoid an excessive solvent flow rate and high reboiler temperatures when said hydrocarbon gas stream is lean and/or when said hydrocarbon gas feed stream is at a pressure above about 400 psia,

the improvement comprising the selective enrichment of said hydrocarbon gas feed stream with recycle of a selected portion of said overhead product to said extracting and stripping step, whereby said extremely high recoveries according to said any selected degree are feasible without said excessive solvent flow rates or said high reboiler temperatures.

4,695,673

PROCESS FOR THE PRODUCTION OF ACYLATED 1,3-DICARBONYL COMPOUNDS

James B. Heather, Hercules, and Pamela D. Milano, Concord, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 798,842, Nov. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 683,882, Dec. 20, 1984, abandoned. This application Jun. 9, 1986, Ser. No. 872,069

Int. Cl.[4] C07C *45/54*

U.S. Cl. 568—310 **49 Claims**

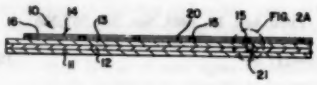
1. A process for producing an acylated cyclical 1,3-dicarbonyl compound by rearrangement of the corresponding enol ester in which the rearrangement is conducted in the presence of a cyanide source which is an alkali metal cyanide, a cyanohydrin of a methyl alkyl ketone having from 1 to 4 carbon atoms in the alkyl group, benzaldehyde cyanohydrin, cyclohexanone cyanohydrin, a cyanohydrin of a C_2–C_5 aliphatic aldehyde, lactonitrile, a lower alkyl silyl cyanide, potassium ferricyanide, or hydrogen cyanide.

4,695,674

PREFORMED, THIN-FILM FRONT CONTACT CURRENT COLLECTOR GRID FOR PHOTOVOLTAIC CELLS

Ari Bar-on, Shaker Heights, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Aug. 30, 1985, Ser. No. 771,262
Int. Cl.[4] H01L 31/04, 31/18
U.S. Cl. 136—256 11 Claims



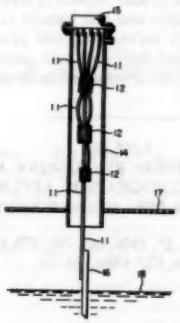
1. A photovoltaic cell comprising:
an electrically conductive substrate layer;
a semiconductor body deposited on said substrate layer;
a transparent electrically conductive layer deposited on said semiconductor body;
preformed thin-film electrically conductive grid means for collecting electrical current from said cell, said grid means having a predetermined physical configuration; and
an electrically conductive adhesive on said grid means to physically and electrically connect said grid means to said transparent electrically conductive layer, said adhesive having a bulk resistive of from about 0.5 ohms-cm to about 5 ohms-cm.

4,695,675

ELECTRIC LEAD DEVICE FOR SUPERCONDUCTING ELECTRIC APPARATUS

Yunichi Yamamoto, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 16, 1986, Ser. No. 919,490
Claims priority, application Japan, Oct. 17, 1985, 60-157834
Int. Cl.[4] H01F 7/24
U.S. Cl. 174—15 CA 6 Claims



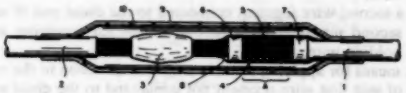
1. An electric lead device for a superconducting electric apparatus comprising:
a coolant tank for storing therein a cryogenic coolant;
a superconducting electric apparatus disposed in said coolant tank;
a lead housing secured to said coolant tank and communicating with the interior of said coolant tank for introducing therein coolant gas vaporized from said cryogenic coolant; and
conductor means received in said lead housing and extending from a normal temperature side to a cryogenic temperature side for electrically connecting said superconducting electric apparatus to the outside, said conductor means being constructed such that the total cross sectional area of said conductor means decreases from said normal temperature side toward said cryogenic temperature side, said conductor means being formed of conductor wire elements each covered with an electrically insulating layer.

4,695,676

CABLE BLOCKING AND BLOCK SPLICE PROTECTION

Alvah A. Lawrence, Los Altos, and Jason W. Neves, Campbell, both of Calif., assignors to Raychem Corp., Menlo Park, Calif.

Filed May 30, 1985, Ser. No. 740,134
Int. Cl.[4] H02G 15/25
U.S. Cl. 174—22 R 5 Claims



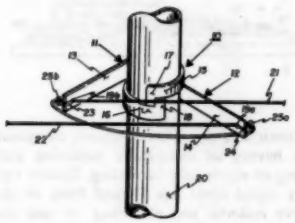
1. An assembly comprising:
a cable containing paper insulation spliced to a cable containing oil or petroleum based material;
a reservoir positioned around at least a portion of the cable containing the oil or petroleum based material wherein the reservoir covers a portion of the conductors of said cable and a portion of the jacket remaining on said cable without covering any part of the splice area;
a particulate material in the reservoir in sufficient amounts to fill the voids between the conductors and to cover the conductors and the cable jacket; and
means positioned around the reservoir to compress the reservoir whereby the particulate material prevents liquids and the oil or petroleum based material from migrating from the interior of said cable into the splice area.

4,695,677

WIRE TENSIONING SYSTEM

Dale G. Ruth, 12021 Donna Ct. NE., Albuquerque, N. Mex. 87112, and Robert J. Yuhas, 824 Omaha NE., Albuquerque, N. Mex. 87123

Filed Jun. 6, 1985, Ser. No. 742,117
Int. Cl.[4] H02G 7/02; H01B 17/16; A01K 3/00; G08B 13/26
U.S. Cl. 194—45 TD 5 Claims



1. A tensioned wire system, comprising:
a. an elongated support member;
b. a first tensioner including a first elongated tensioning arm having flexibility in a direction perpendicular to the elongated dimension thereof, means for receiving and holding wire at the distal end thereof and means for affixing said first tensioner to said elongated support member in a direction substantially perpendicular to the longitudinal axis of said support member, said first tensioner being attached to said elongated support member by said affixing means;
c. a second tensioner substantially identical to said first tensioner and having a second elongated tensioning arm, said second tensioner attached in a similar manner to said

elongated support member and placed alongside said first tensioner, said first tensioner and said second tensioner oriented to form a V-shape in a plane perpendicular to the longitudinal axis of said elongated support member;

d. means for interconnecting said first tensioner and said second tensioner, whereby said first tensioner and said second tensioner are prevented from rotating about the axis of said elongated support member when substantially equal and opposite forces are applied to the distal ends of said first and second tensioners;

e. a first wire segment connected to the distal end of said first tensioner by said first means for receiving and holding wire;

f. a second wire segment connected to the distal end of said second tensioner by a second means for receiving and holding wire;

g. means for applying force in a chosen direction to the end of said first wire segment not connected to the distal end of the first tensioner, the force being sufficient to deflect said first tensioning arm in the direction of the force, whereby the combination of the force applied to the end of the first wire segment and the restorative force of the deflected first tensioning arm provides tension to said first wire segment; and

h. means for applying a second force to the end of said second wire segment not connected to the distal end of the second tensioner in a direction approximately opposite the force applied to the first wire segment, the force being sufficient to deflect said second tensioning arm in the direction of the second force whereby the combination of the second force and the restorative force of the deflected second tensioning arm provides tension to said second wire segment.

4,695,678

ELECTRONIC DEVICE CARRIER

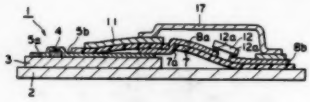
Masanori Itagaki; Junichi Takahashi, both of Tokyo, and Hideyasu Endou, Atsugi, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 5, 1984, Ser. No. 658,147

Claims priority, application Japan, Oct. 8, 1983, 58-187694

Int. Cl.[4] H01L *23/02*

U.S. Cl. 174—52 FP **5 Claims**



1. An electronic device carrier structure, comprising:

a substrate having an electrically insulating surface and comprising an electrically insulating, flexible tape;

at least one signal input line formed from an electrically conductive material and extending on said electrically insulating surface, said signal input line having a signal input end and a first connecting end at the other end;

at least one signal output line formed from an electrically conductive material and extending on said electrically insulating surface, said signal output line having a signal output end at one end and a second connecting end at the other end;

at least one electronic device carried on said substrate and connected to said first and second connecting ends;

at least a pair of guard lines each of which is formed on said electrically insulating surface and extends substantially along a corresponding side of said at least one signal input line; and

an electrically conductive support for supporting thereon said flexible tape and an electrically conductive cover which is electrically connected to and fixedly attached to said electrically conductive support for substantially covering said flexible tape from above.

4,695,679

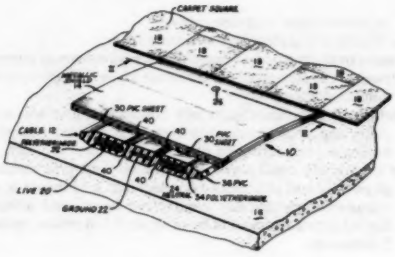
FLAT MULTICONDUCTOR CABLE FOR UNDERCARPET WIRING SYSTEM

Richard F. Strauss, Morrisville, Pa.; Phillip Herb, Somerville, N.J.; Peter Noorily, Bridgewater, N.J., and Julio Rodrigues, Linden, N.J., assignors to Thomas & Betts Corporation, Raritan, N.J.

Filed Aug. 19, 1985, Ser. No. 767,306

Int. Cl.[4] H01B *7/08*

U.S. Cl. 174—117 FF **19 Claims**



1. An electrical cable for use in an undercarpet wiring system wherein said cable is likely to be exposed to an alkaline environment, said cable comprising:

a plurality of elongate electrical conductors extending generally parallel to each other in side by side relation, said conductors including live, ground and neutral conductors,

a layer of insulation individually surrounding each of said live and said neutral conductors,

a casing of insulation surrounding said conductors and being in adhered relation to said respective layers of insulation surrounding said live and said neutral conductors, said casing substantially surrounding said ground conductor and being in contact therewith, said casing of insulation being substantially free from attack in an alkaline environment.

4,695,680

STYLUS FOR POSITION RESPONSIVE APPARATUS HAVING ELECTROGRAPHIC APPLICATION

Robert G. Kable, Dublin, Ohio, assignor to Scriptel Corporation, Columbus, Ohio

Filed Jun. 27, 1986, Ser. No. 879,331

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—19 **20 Claims**

1. A stylus for receiving position responsive signals from an electrographic surface for transmission by cable to a control circuit, said surface being excited by a time varying source of select frequency, comprising

an elongate, hand grippable, body having an outwardly disposed electrically conductive first wall surrounding a first cavity, a forwardly disposed nose portion and a rearwardly disposed region;

an elongate cartridge having an electrically conductive second wall extending about a second cavity to a tip receiving portion and further extending to a rearward

edge, an electrically insulative tip fixed within said tip receiving portion, an electrically insulative spacer coupled with said rearward edge and supported within said second cavity, an elongate, electrically conductive signal transmission rod extending through said second cavity, spaced from said second wall and supported between said electrically insulative tip and said electrically insulative spacer, spring mounting means extending rearwardly from said insulative spacer for retaining an electrically conductive spring and effecting electrical contact between said signal rod and said spring, said cartridge second wall being supported within said first cavity and said cartridge being slideable to a retracted position exposing a predetermined length of said signal transmission rod at said electrically insulated tip selected to receive said position responsive signals outwardly from said nose portion;

spring retainer means mounted within said first cavity rearward region for providing a spring biasing support;

electrically conductive spring means mounted upon said spring mounting means and in biased relationship against said spring retainer means; and

circuit means mounted within said first cavity rearwardly disposed region for receiving said position responsive signals from said electrically conductive spring means for effecting transmission of position data signals in correspondence therewith through said cable and electrically effecting ground communication between said first wall and said cable.

4,695,681

MEMBRANE FOR MEMBRANE SWITCHES AND COMPOSING ELEMENTS THEREOF

Koen Velleman, Gavere, Belgium, assignor to Velleman-Switch, naamloze vennootschap, Gent, Belgium

Filed May 15, 1986, Ser. No. 863,341

Claims priority, application Belgium, May 22, 1985, 2/60691

Int. Cl.⁴ H01H *13/70*

U.S. Cl. 200—5 A **13 Claims**

10. A membrane switch comprising:

(a) a profiled top membrane layer of resilient material;

(b) a underlying supporting layer having an upper surface, an underside and an opening therein;

(c) said top layer being positioned on said upper surface of said underlayer and having a recess fitted in said opening, said recess formed by sidewall means extending downwardly into said opening and a spherical segment extending upwardly into said opening and being suspended from an edge formed by a junction between said sidewall means and said spherical segment;

(d) an under-layer supporting said underlying layer; and

(e) cooperating electrical contact elements on said underlayer and on said spherical segment.

4,695,682

SEAT SWITCH

Ray F. Winogrocki, 18975 Holbrook, East Detroit, Mich. 48021

Filed Dec. 23, 1985, Ser. No. 812,426

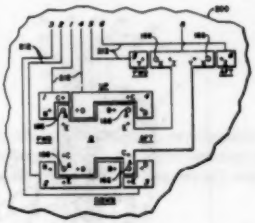
Int. Cl.⁴ H01H *9/00*

U.S. Cl. 200—5 R **20 Claims**

4. A switch for controlling the positioning of apparatus, said switch generating an appropriate signal to cause the apparatus to be displaced in the same direction that the switch knob is displaced, and said switch knob being capable of horizontal and vertical motion as ell as one or both ends of the switch being capable of relative rotational motion, the improvement comprising:

said switch including two contacts each having two contact surfaces;

means mechanically connecting the contacts with the switch knob such that vertical and horizontal motion of the switch knob displaces all four contact surfaces vertically or horizontally, such that relative rotation of a first end of the knob without displacement of the other end of the



knob displaces one contact, and such that relative rotation of the other end of the knob without displacement of the first end of the knob displaces the other contact; and

a pattern of electrical contact pads positioned to be engaged by the electrical contacts, said pattern being arranged relative to the contacts such that displacement of the knob in any direction of motion causes the contacts to engage the pads in a pattern indicative of the motion imparted to the knob whereby an appropriate signal is generated.

4,695,683

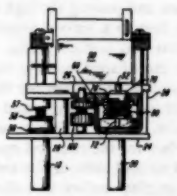
ELECTRIC APPLIANCE TIMER WITH AUTOMATIC TURN OFF

William C. Wingler, Boylston, and Edward V. Pomponio, Milford, both of Mass., assignors to Telechron, Inc., Ashland, Mass.

Filed Jul. 23, 1986, Ser. No. 888,969

Int. Cl.⁴ H01H *43/00, 7/08*

U.S. Cl. 200—38 R **16 Claims**



1. In a timer assembly for control of an electrical device, said timer assembly including a motor, a clockwork gear train rotated by said motor, manually-operable means for determining a set-time, an electrical switch controlling said device, and actuator means responsive to the rotation of said gear train and cooperating with said manual set-time neans for actuating said switch at said set-time, the improvement comprising:

said actuator means including means responsive to the rotation of said gear train for deactuating said switch within a predetermined time interval,

means responsive to the actuation of said switch for engaging said deactuating means with said gear train, and

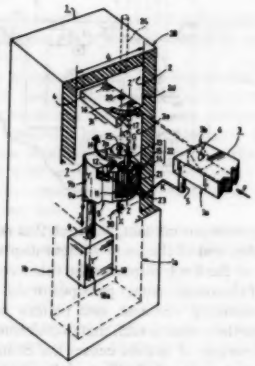
means connected to said actuator means for maintaining said switch deactuated at the end of said predetermined time interval.

4,695,684

ELECTRIC SAFETY SWITCH

Michel Bochard, Ruelle, and Michel Lafaye, Angouleme, both of France, assignors to La Telemecanique Electrique, France

Filed Mar. 18, 1986, Ser. No. 840,833
Claims priority, application France, Mar. 18, 1985, 85 03938
Int. Cl.[4] H01H 27/00
U.S. Cl. 200—43.07 3 Claims



1. A safety switch comprising:

i. a case and a partition wall in said case forming first and second chambers therein and leaving a passage from the first to the second chambers; said partition wall having a slot shaped as an arc of a circle and a locking recess;

ii. A switch unit housed in the second chamber and having an elongate pusher movable along a direction at right angles with said partition wall;

iii. a rotary cam shaped as a cylindrical sector mounted for rotating in the second chamber about an axis parallel to said direction and passing through the center of said circle, from a first to a second angular position, said cam having a first end surface facing said partition wall, a second end cam-shaped surface, engaging said pusher to switch the switch unit, when the cam passes from its first to its second angular position, and a cylindrical side surface, said cam further having a radial groove defining a driving surface for the cam and opening on said first end surface and on said side surface and an elongate housing defining a guiding surface in a direction parallel to said axis;

iv. a spring-actuated retractable locking member mounted for moving along said guiding surface from a first to a second positions and having a shoulder which engages said locking recess to prevent rotation of the cam when the locking member is in its first position and an end portion which projects beyond said shoulder through said slot when the locking member is in its first position;

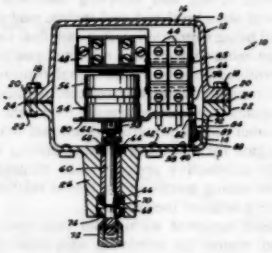
v. a key form fittingly engageable into the first chamber and having an inclined surface portion which pushes said end portion to disengage said shoulder from said locking recess and moves the locking member into its second position, said key further having a stud which passes through said passage and engages the driving surface of the radial groove for rotating said cam from its first to its second positions.

4,695,685

ROTATING PADDLE BIN LEVEL INDICATOR

Phillip P. Fleckenstein, and Norman F. Marsh, both of Port Huron, Mich., assignors to Berwind Corporation, Philadelphia, Pa.

Filed Jul. 28, 1986, Ser. No. 889,699
Int. Cl.[4] H01H 35/00
U.S. Cl. 200—61.21 5 Claims



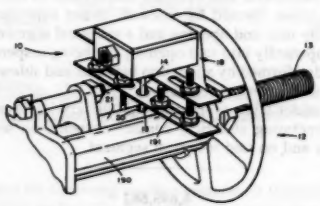
1. Apparatus for indicating level of material in a storage bin comprising a hollow enclosure including means for mounting said enclosure to a storage bin, a motor mounted for limited movement within said enclosure between first and second positions, a paddle operatively coupled to said motor and constructed to be disposed for rotation within said bin, rotation of said paddle being retarded when material stored in said bin is at a level so as to stallably engage said paddle, means mounted in fixed position within said enclosure for detecting limited movement of said motor between said first position when rotation of said paddle is not retarded by material stored in the bin and said second position when rotation of said paddle is retarded by material stored in said bin, and spring means extending between means projecting from said motor and means affixed to said enclosure for urging said motor to both said first and second positions such that said spring means must be urged over center during motion of said motor in either direction between said first and second positions.

4,695,686

VALVE SUPERVISORY SWITCH

David E. Merchant, Lincoln, Nebr., assignor to Emhart Industries Inc., Indianapolis, Ind.

Filed Sep. 15, 1986, Ser. No. 906,992
Int. Cl.[4] H01H 9/06
U.S. Cl. 200—61.86 8 Claims



1. A valve supervisory switch for supervising a valve having a movable portion, said supervisory switch comprising:

a housing having a port;

a switch within said housing, said switch including a switch actuating means;

a swing actuator member;

pivot means for pivotable supporting said swing actuator member;

a linear actuator member;

means for supporting said linear actuator member while permitting it to move linearly;

coupling means for permitting coupling of said swing actuator member to said housing with said swing actuator member extending through said port and engagable with said switch actuating means for actuating said switch and for permitting coupling of said linear actuator member to said housing with said linear actuator member extending through said port and engagable with said switch actuating means for actuating said switch; and

means for attaching said housing to said valve with one of said actuator members coupled to said housing by said coupling means and actuable by said movable portion of the valve.

4,695,687

CONTACT ARRANGEMENT FOR VACUUM SWITCHES WITH AXIAL MAGNETIC FIELD, AND METHOD FOR THE PRODUCTION OF THE RESPECTIVE CONTACT PIECES

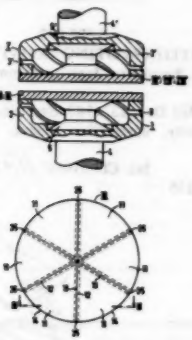
Joachim Grosse, Erlangen; Ruediger Hess, Berlin; Wilfried Kuhl, Weadelstein, and Reiner Mueller, Steinbach, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 23, 1987, Ser. No. 29,502

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610243

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **24 Claims**



1. A contact arrangement for vacuum switches having an axial magnetic field, the arrangement comprising: contact members including disk shaped contact bodies, contact carriers have the contact members soldered to them and including means for reducing eddy currents, the contact bodies comprising a plurality of discrete elements affixed to the contact carrier wherein their edges form joints that define conductivity jumps for suppression of the eddy currents.

4,695,688

ELECTRICAL CONTACT CONSTRUCTION

George A. Farrall, Rexford, N.Y., and Raymond K. Seymour, Plainville, Conn., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 24, 1986, Ser. No. 843,435

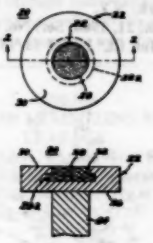
Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **13 Claims**

1. An electrical contact assembly for use in a circuit breaker, comprising:

a generally disc shaped metal contact having first and second major surfaces;

a metal contact support connected integrally with said first contact surface; and



a disc shaped electrically insulating insert disposed concentrically in said second contact surface forming an insulator-metal boundary therewith at the second contact surface.

4,695,689

VACUUM CIRCUIT BREAKER

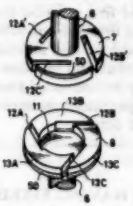
Yukio Kurosawa, and Kiyoji Iwashita, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 799,484

Claims priority, application Japan, Nov. 22, 1984, 59-246043

Int. Cl.[4] H01H *33/66*

U.S. Cl. 200—144 B **1 Claim**



1. A vacuum circuit breaker comprising a pair of separable disc shaped electrodes facing to each other and disposed in a vacuum casing, a pair of conductive rods connected to each of said disc shaped electrodes at their non-facing surfaces and extending through the vacuum casing in an air tight manner, each disc shaped electrode including an annular circular part formed around the outer circumferential portion of the disc shaped electrode, a round recessed part formed on the inner portion thereof and surrounded by the annular contact part, and arc preventing means including at least three straight grooves extending from the outer periphery of the annular contact part to the inner periphery thereof for preventing arcing on the round recessed part during a circuit breaking operation of the vacuum circuit breaker, said disc shaped electrode further including an elastic support plate placed on the non-facing surface thereof, the elastic support plate being provided with at least three straight grooves aligned with the straight grooves formed on the respective annular parts.

4,695,690

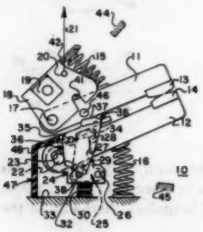
CLOSING DELAY ARRANGEMENT FOR CURRENT LIMITING CIRCUIT BREAKER CONTACTS

Claudio Banfi, Rovello Porro, Italy, assignor to General Electric Company, New York, N.Y.

Filed Jan. 21, 1986, Ser. No. 820,051

Int. Cl.[4] H01H *33/18*

U.S. Cl. 200—147 R **7 Claims**



1. A closing delay arrangement for circuit breaker contacts comprising:

a first movable contact arm having a first contact and a second movable contact arm having a second contact said first and second movable contact arms being arranged for electrodynamic repulsion upon the occurrence of short circuit current through said contacts and being biased toward each other by a pair of opposedly arranged contact springs, said first contact arm being pivotally attached to a first support means under control of a circuit breaker operating mechanism for moving said first contact arm between a closed and a fully open position, said first contact arm being moved to a partially open position by means of electrodynamic repulsion between said first and second contact arms independent of said circuit breaker operating mechanism, said second arm being pivotally attached to a second support means for movement between first and second positions; and

a pawl pivotally attached to said second support means, and being biased to a first position for holding said second contact arm in said first position for holding said second contact arm in said first position whereby a detent on said pawl captures a post on said second contact arm to hold said second contact arm in said first position, said second contact arm being moved to said second position by said circuit breaker operating mechanism when said post is released from said detent.

4,695,691

SWITCH HOUSING HAVING FIXED EXTERNAL NUTS FOR ATTACHMENT OF CONTACTS AND TERMINALS

Henrik Leth-Olson, Ringsted, and Lajos K. D. Marot, Virum, both of Denmark, assignors to Aktieselskabet Laur.Knudsen Nordisk Elektricitets Selskab, Copenhagen, Denmark

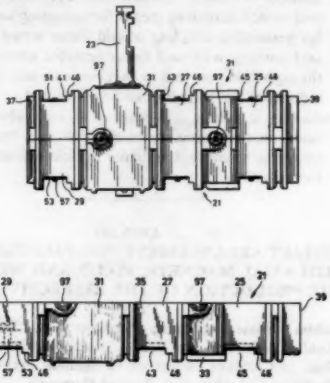
Filed Jan. 8, 1986, Ser. No. 817,107

Claims priority, application Denmark, Jan. 14, 1985, 161/85

Int. Cl.[4] H01H *19/04*

U.S. Cl. 200—303 **6 Claims**

1. A housing having a hollow interior for receiving a complete switching mechanism for a multipole power switch of the kind including a reciprocative contact bridge supporting a plurality of movable contacts for short circuiting pairs of corresponding L-formed fixed contacts, said housing comprising two identical halves forming a bottom member and a top member and having a longitudinal dimension and a transverse dimension, the bottom member having a bottom wall and the top member having a top wall, each member also having two symmetrical end walls and two mutually symmetrical side walls, wherein the outer surface of said bottom wall and said top wall are provided with transverse grooves for receiving mounting ends of the L-formed fixed contact members and external terminals, said transverse grooves being provided with elongated holes for receiving contact ends of the L-formed fixed contact members, and wherein plate-shaped nut members are secured from the inside of the housing in each end



of said transverse grooves, said nut members being provided with threaded holes for receiving screws for fastening the mounting ends of L-formed fixed contacts and external terminals in one operation.

4,695,692

SWITCH WITH PIVOTING CLIP-TYPE CONTACTS

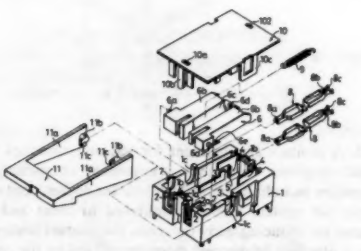
Yasuhiko Noda, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Dec. 13, 1985, Ser. No. 809,056

Claims priority, application Japan, Dec. 13, 1984, 59-189113[U]

Int. Cl.[4] H01H *21/62*

U.S. Cl. 200—335 **4 Claims**



1. A switch having pivoting clip-type movable contacts, comprising:

a casing provided with a common terminal at one end and, at an opposite end of the casing, a normally-open terminal spaced apart by a gap from a normally-closed terminal, said terminals being planar in shape and arranged parallel to each other in one vertical plane;

a pivot member having one end pivotably mounted at said one end of said casing and its other end adapted to be pivotably moved along an arcuate path which includes said normally-closed terminal, said gap, and said normally-open terminal;

clip-type movable contacts having a first pair of clip contacts at a first end and a second pair of clip contacts at

a second end remote from said first end, said clip-type movable contacts being held in said pivot member such that said first end thereof is disposed at said one end of said pivot member and said second end is disposed to be pivotably moved with said other end of said pivot member along said arcuate path, said first pair of clip contacts being clampingly engaged in a supporting hole bored in said common terminal so as to be in electrical contact with said common terminal and pivotally supported thereby, and said second pair of clip contacts being clampingly engageable with said normally-closed and said normally-open terminals;

a returning spring connected between said pivot member and said casing for biasing said pivot member to a return position; and

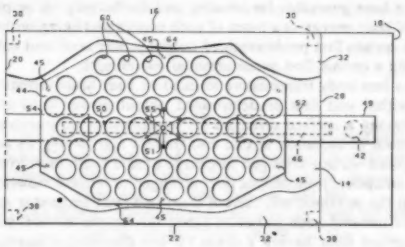
a lever pivotally mounted at one end to said casing and having a control piece which engages a portion of said pivot member so as to pivot said pivot member and move said second pair of clip contacts between said normally-closed and said normally-open terminals, said lever having an operating portion at its other end remote from said one end thereof and extending from said casing for operating the movement of said second pair of contacts between said terminals.

4,695,693

TRIANGULAR ANTENNA ARRAY FOR MICROWAVE OVEN

James E. Staats, and Louis H. Fitzmayer, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 2, 1986, Ser. No. 915,048
Int. Cl.[4] H05B 6/72
U.S. Cl. 219—10.55 F **4 Claims**



1. A microwave cooking appliance comprising:

a cooking cavity for receiving objects to be heated, defined by a top wall, a bottom wall, a back wall, a pair of opposing side walls and a front wall defined by a front opening access door;

a microwave pervious support shelf disposed within said cavity spaced above and extending generally parallel to said bottom wall;

a source of microwave energy;

a generally planar antenna member disposed between said bottom wall and said support shelf, said antenna member being centered laterally in said cavity and extending over a substantial portion of said bottom wall, said antenna member having a peripheral edge spaced apart from said front, back and side walls thereby defining a peripheral region between said front, back, side and bottom walls and said peripheral edge of said antenna member; said member having formed therein a plurality of radiating circular apertures arranged in triangular fashion such that straight lines connecting the centers of any three closely adjacent apertures intersect to define an equilateral triangle;

means for coupling microwave energy from said microwave energy source to the center point of said antenna member comprising a microwave strip line member extending from said source beneath said antenna member and electrically connected to the center point of said antenna member;

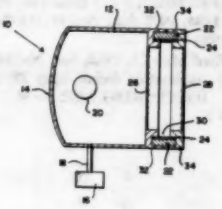
whereby microwave energy radiates from said apertures to heat items placed on said support shelf from below and energy is radiated through said peripheral region into the interior of said cavity and reflected by said front, back and top walls to heat the items on said shelf from above.

4,695,694

STRUCTURE FOR MINIMIZING MICROWAVE LEAKAGE

James D. Hill, Mount Airy, Md., and Gene R. Wooden, Sterling, Va., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Feb. 14, 1986, Ser. No. 829,343
Int. Cl.[4] H05B 6/76
U.S. Cl. 219—10.55 D **8 Claims**



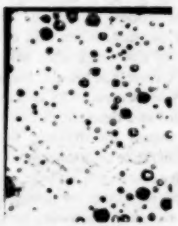
1. Apparatus for using microwave energy comprising walls defining a microwave cavity, said walls including a light window comprising an inner screen and a spaced-apart outer screen, each of said screens being substantially transparent to light and relatively opaque to microwave energy, said apparatus further including microwave absorbing material disposed between the two screens only at or near the periphery of the light window.

4,695,695

MIXTURE FOR PRODUCING FRACTURE-RESISTANT, FIBER-REINFORCED CERAMIC MATERIAL BY MICROWAVE HEATING

Thomas T. Meek, Los Alamos, and Rodger D. Blake, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 3, 1985, Ser. No. 719,654
Int. Cl.[4] H05B 6/64; C04B 35/36
U.S. Cl. 219—10.55 M **14 Claims**



1. A method for producing a fracture-resistant, fiber-reinforced ceramic material comprising the steps of:

a. preparing a ceramic precursor mixture comprisinng glass material, a coupling agent, and resilient fibers;

b. enclosing said mixture with an insulative material;

c. microwaving said mixture at a power, time, and frequency sufficient to bond ceramic material to said fibers; and

d. allowing said material to cool, thereby securing a fracture-resistant, fiber-reinforced ceramic material.

4,695,696

ELECTRIC DISCHARGE MACHINE WITH CONTROL OF THE MACHINING PULSE'S CURRENT VALUE IN ACCORDANCE WITH THE DELAY TIME

Yoshio Ozaki; Kazuo Tsurumoto; Takeshi Yatomi, and Masahiro Yamamoto, all of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

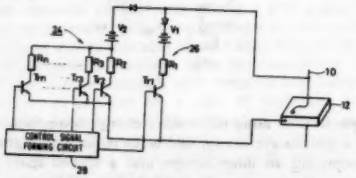
PCT No. PCT/JP83/00167, § 371 Date Jan. 30, 1984, § 102(e) Date Jan. 30, 1984, PCT Pub. No. WO83/04204, PCT Pub. Date Dec. 8, 1983

PCT Filed May 27, 1983, Ser. No. 584,440

Claims priority, application Japan, May 28, 1982, 57-90799

Int. Cl.[4] B23H *1/02, 7/04*

U.S. Cl. 219—69 P **8 Claims**



1. An electric discharge machine comprising a main switch circuit for supplying a current high in current peak value between electrodes which are made up of an electrode and a conductive workpiece and an auxiliary switching circuit for supplying a current low in current peak value between said electrodes, to intermittently cause electric discharge between said electrodes thereby to machine said workpiece; said electric discharge machine further comprising control signal forming circuit means for turning switching elements of said main switching circuit and said auxiliary switching circuit on and off, said control signal forming circuit means comprising: initial voltage applying means for applying an initial voltage across said electrodes with the aid of said auxiliary switching circuit; a decision time setting circuit for setting a time long enough to decide whether discharge occurring between said electrodes is normal; a detector circuit for detecting the occurrence at least one of the group of discharge and short-circuiting between said electrodes; an initial voltage application continuing means for causing, when said detector circuit detects the occurrence of discharge after said time set by said decision time setting circuit has passed, the application of the initial voltage across said electrodes by said auxiliary switching circuit to continue until said detector circuit detects the occurrence of discharge; means for driving, when said detector means detects the occurrence of discharge after the application of the initial voltage by said initial voltage application continuing means is continued, said main switching circuit to supply a normal current between said electrodes according to a given surface roughness; and means for driving, when said detector circuit detects at least one of the group of the occurrence of discharge within the time set by said decision time setting circuit and the occurrence of short-circuiting, at least one of said main switching circuit and said auxiliary switching circuit to immediately apply a current smaller than said normal current between said electrodes.

4,695,697

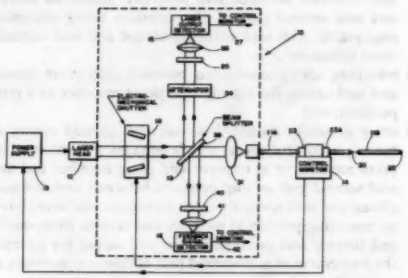
FIBER TIP MONITORING AND PROTECTION ASSEMBLY

Nadhir B. Kosa, Minneapolis, Minn., assignor to GV Medical, Inc., Minneapolis, Minn.

Filed Dec. 13, 1985, Ser. No. 808,737

Int. Cl.[4] B23K *26/02*

U.S. Cl. 219—121 LZ **14 Claims**



1. In a control system for use with a laser generated radiation system utilizing, in combination, a laser generator, a lens means, and an optical fiber for transmission of radiation in the form of laser energy from the generator to the lens, the lens means comprising a laser energy transmitting lens body with a pair of opposed surfaces, one of said surfaces being arranged for reception of an incoming beam of radiation from the distal tip end of an adjacent optical fiber and thence through said lens body; said control system comprising:

(a) a laser generator for creating and discharging an output of laser energy as a beam of such energy and being within a certain first predetermined output power level and having a certain first predetermined wavelength;

(b) a lens body transmissive to incident laser beam radiation within said first predetermined output power level and having a surface arranged for reception of an incoming beam of radiation at one end thereof and having an opposed surface arranged discharge of said beam therefrom;

(c) an optical transmitting fiber arranged to receive radiation at the proximal end thereof from said laser generator and to transmit such radiation along the length thereof, said optical fiber having a distal tip end disposed adjacent a surface of said lens body;

(d) said lens means emitting fluorescent radiation within a certain second predetermined wavelength upon excitation through exposure to said laser beam, said second predetermined wavelength being significantly different from said first predetermined wavelength; and

(e) sensing means for detecting the radiation emitted from said lens body.

4,695,698

METHOD OF, AND APPARATUS FOR, GENERATING A PREDETERMINED PATTERN USING LASER RADIATION

Jean-Michel Mayor, Lausanne; Jürg Steffen, Sigriswil, and Peter Wüthrich, Frauenfeld, all of Switzerland, assignors to Larassay Holding AG, Thundorf, Switzerland

Filed Jul. 2, 1985, Ser. No. 751,258

Claims priority, application Switzerland, Jul. 10, 1984, 3337/84; May 22, 1985, 2174/85

Int. Cl.[4] B23K *26/00*

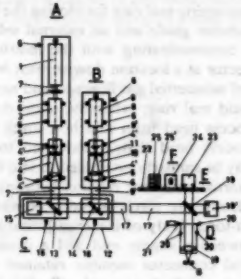
U.S. Cl. 219—121 L **58 Claims**

1. A method of generating by means of a writing laser beam a predetermined pattern on a workpiece containing a three-dimensional integrated circuit and which is provided with a metalized raster, said method comprising the steps of:

displacing said workpiece and said writing laser beam relative to each other along substantially line-like paths of movement;

scanning said metalized raster using said writing laser beam during said relative displacing movement of said workpiece and said writing laser beam and thereby generating reflected light originating from said writing laser beam;

modulating said writing laser beam during said scanning step of the operation;



placing a radiation detector so as to receive said reflected light originating from said writing laser beam and to generate corresponding output signals; and

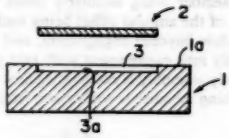
evaluating the output signals generated by said radiation detector in order to determine the relative positions of said workpiece and said writing laser beam and to possibly correct said relative displacing movements of said workpiece and said writing laser beam while writing said predetermined pattern.

4,695,699

METHOD OF MAKING COMPOSITE MEMBER

Koji Yagii; Jun Miyata, and Shunzo Takasuga, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Apr. 21, 1986, Ser. No. 854,382
Claims priority, application Japan, Apr. 30, 1985, 60-90967
Int. Cl.[4] B23K *28/02, 26/00, 20/14*
U.S. Cl. 219—121 LD **5 Claims**



1. A method of making a composite member, which comprises the steps of:

(i) fitting a functional member constituted by an aluminum composite material capable of providing a desired target function to a recess of a base material constituted by an aluminum alloy and having said recess on a surface required to exhibit said desired target function,

(ii) beam-welding, in a non-oxidizing atmosphere, the entire peripheral section exposed at the outer surface among the joining sections of said base material with said functional member, and

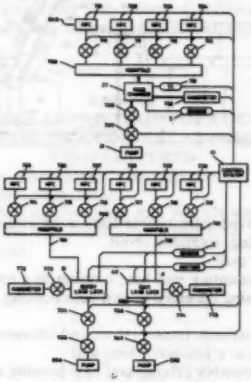
(iii) subjecting said beam-welded base material and said functional member to diffusion bonding by pressing them at least in the fitting direction and heating them.

4,695,700

DUAL DETECTOR SYSTEM FOR DETERMINING ENDPOINT OF PLASMA ETCH PROCESS

John D. Provence, Mesquite; Frederick W. Brown, Colleyville, and John I. Jones, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 22, 1984, Ser. No. 663,903
Int. Cl.[4] B23K *15/00*
U.S. Cl. 219—121 PD **14 Claims**



1. An apparatus for the manufacturing of semiconductor devices from semiconductor wafers having a plurality of semiconductor circuit patterns on at least a first surface of the semiconductor wafer, the apparatus comprises:

first means for providing a stream of reacting gases to react with the semiconductor wafer to create circuit elements according to the semiconductor circuit pattern thereby;

second means for handling the wafers and includes a third means for bringing the wafers into contact with the reacting gas, fourth means for degassing of the semiconductor wafers, fifth means for preventing the contamination of the third means and to provide a port for the transfer of the semiconductor wafers from the fourth means to the third means; sixth means for isolating the semiconductor wafers and the circuit elements from the third means, seventh means for providing a port for the transfer of the semiconductor wafer between the third means and the sixth means, and eighth means for transferring the semiconductor wafer from the fourth means to the third means and from the third means to the sixth means; and

twenty-fifth means for detecting when the etching performed by the reacting gases has reached a predetermined depth in the semiconductor wafer, wherein the twenty-fifth means further comprises:

twenty-seventh means for illuminating the first surface of the semiconductor wafers; and

twenty-eighth means for detecting reflected lights when reflected from trace materials in the reacting gases, said trace materials being released from the semiconductor wafer during etching by the reacting gases, wherein the twenty-eighth means comprises:

first detector means for detecting the reflected light;

second detector means for detecting the reflected light; and

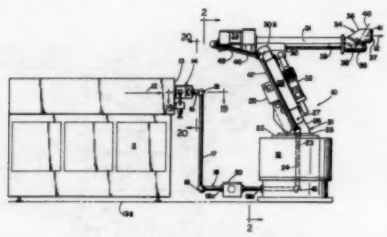
twenty-ninth means for comparing the output of the first detector means to the output of the second detector means.

4,695,701

LASER WRIST

Robert C. Monteith, Milford, and Robert E. Borgmann, Cincinnati, both of Ohio, assignors to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 17, 1986, Ser. No. 840,361
Int. Cl.[4] B23K *26/08*
U.S. Cl. 219—121 LV **16 Claims**



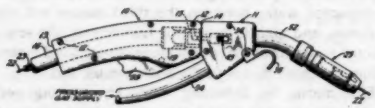
1. An improved articulatable laser wrist assembly, having:
a base housing, rotatable about
a first wrist axis:
means for mounting said base housing to a robotic arm:
a turret housing mounted to said base housing, and rotatable about
a second wrist axis, transverse to, and intersecting, said first wrist axis at a junction point; and
means for rotatably driving said base housing and said turret housing, said means for driving including drive elements concentric with said first wrist axis;
wherein the improvement comprises:
a continuous laser beam pathway through said base housing and said turret housing, said beam pathway extending collinearly with said first and second wrist axes; and
at least one mirror having a reflecting surface, said mirror mounted to said wrist assembly with said reflecting surface intercepting said junction point of said first and second wrist axes.

4,695,702

WELDING-PROCESS HANDLE FOR INTERCHANGEABLE WELDING-PROCESS HEADS

Thomas J. Gartland, Huntington Station, N.Y., assignor to Eutectic Corporation, Flushing, N.Y.

Filed Apr. 11, 1986, Ser. No. 850,628
Int. Cl.[4] B23K *9/16*
U.S. Cl. 219—137.63 **12 Claims**



1. An electric-arc torch assembly comprising an elongate tubular host-torch body of electrically insulative material extending between a supply end and a discharge end, a first tubular metal connector member retained within said host-torch body at said discharge end, a flexible hose connected to said connector member via the supply end of said host-torch body, said hose containing a tubular guide for consumable electrode material fed to and through said first connector member, and said hose having internal clearance with said guide and therefore provision for gas flow to said first connector member, said hose also containing flexible electrical-conductor material connected to said first connector member; and a welding-process head having a supply end detachably connected to the discharge end of said host-torch body via said first connector member, said welding-process head extending between said supply end and a discharge end and having a tubular casing of electrically insulative material, a second tubular metal connector member retained within said welding-head casing at the supply end thereof and having internal clearance with said tubular guide, adjacent ends of said metal connector members having coacting detachable formations for removable assembly of the welding-process head to said host-torch body; said welding-process head including a gas-constricted arc-nozzle connected to the discharge end of said head, an elastomeric seal ring for closing the internal clearance with said tubular guide and an external side-port gas-supply connection communicating with the interior of said second metal connector at a location downstream from said seal ring, for supply of substantial gas flows to said nozzle without back flow past said seal ring; whereby, upon detachment of said welding-process head from said host-torch body, a different welding process head that is dedicated to gas-shielded arc purposes may be similarly assembled to said host-torch body in unsealed internal-clearance relation with said tubular guide.

10. An electric-arc torch assembly comprising an elongate tubular host-torch body of electrically insulative material extending between a supply end and a discharge end, a first tubular metal connector member retained within said host-torch body at said discharge end, a flexible hose connected to said connector member via the supply end of said host-torch body, said hose containing a tubular guide for consumable electrode material fed to and through said first connector member, and said hose having provision for gas flow to said first connector member, said hose also containing flexible electrical-conductor material connected to said first connector member; and a welding-process head having a supply end detachably connected to the discharge end of said host-torch body via said first connector member, said welding-process head extending between said supply end and a discharge end and having a tubular casing of electrically insulative material, a second tubular metal connector member retained within said welding-head casing at the supply end thereof, adjacent ends of said metal connector members having coacting bayonet-lock formations for removable assembly of the welding-process head to said host-torch body; said adjacent ends comprising fitted coaxial male and female surfaces and said bayonet-lock formations including a radial pin extending outward of the male surface and an L-shaped groove for said pin on the female surface, said groove providing a substantially axial region of pin/groove engagement adjacent a rotational region of pin/groove engagement, and an axially shiftable locking member carried with a connecting member having said male surface, said locking member being angularly offset from said radial pin, the extent of the angular offset being such that upon rotation into complete bayonet engagement, said locking member may shift axially into engagement with said groove, whereby the head-to-body assembly is retained against bayonet rotation unless said locking member is withdrawn from groove engagement.

4,695,703

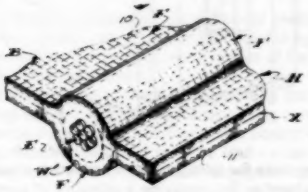
FLEXIBLE BLANKET HEATER

David E. Williams, and Edwin D. Hoyt, both of Hemet, Calif., assignors to Amark Industries, Inc., San Jacinto, Calif.

Filed Apr. 25, 1986, Ser. No. 855,925
Int. Cl.[4] H05B *3/36*
U.S. Cl. 219—212 **6 Claims**

1. A flexible blanket resistance heater structure comprising a thin, flexible, normally horizontal blanket structure of elastic dielectric material having a normally horizontal central plane and substantially flat top and bottom surfaces spaced above and below said central plane, an elongate flexible resistance element of metal alloy, the modulus of elasticity of which is materially less than the modulus of elasticity of said dielectric material, said element is positioned within said blanket structure on said central plane and formed to extend about and

throughout said plane with all portions thereof in horizontal spaced relationship from each other, said element has terminal end portions accessible from the exterior of the blanket structure to connect with an electric power supply, the portions of the blanket structure and spaced from the element are free to bend to radii smaller than the smallest radii to which said element can bend within the limits of the modulus of elasticity of the alloy of which said element is made; and elongate top and bottom welts of said dielectric material on and projecting upwardly and downwardly from said top and bottom surfaces of the blanket structure adjacent to and coextensive with said element, said welts have outside surfaces joined with related



top and bottom surfaces, said welts establish curved, compacted, element-supporting masses of said dielectric material about the inside circumference of bends formed in the blanket structure adjacent said element and limit bending of said element beyond and modulus of elasticity of said alloy, and flexible fabric reinforcements are set within said elastic dielectric material adjacent said top, bottom and outside surfaces imparting the heater structure with planar dimensional stability and limiting elastic flow and displacement of said dielectric material about the inside circumference of bends formed in the blanket structure and to cause said supporting masses of dielectric material to compact substantially rigidly.

4,695,704

HAIR GROOMING ATTACHMENT FOR A CURLING IRON

Matthew L. Andis, 5315 Wind Point Rd., Racine, Wis. 53402

Division of Ser. No. 415,372, Sep. 7, 1982, Pat. No. 4,496,825, which is a continuation-in-part of Ser. No. 059,676, Jul., 1979, abandoned. This application Sep. 27, 1984, Ser. No. 655,320

Int. Cl.[4] A45D *1/04, 1/18;* **H05B** *3/00*

U.S. Cl. 219—222 **7 Claims**

1. A hair curling iron comprising a handle, an elongated heating element attached to said handle and having an outer circular peripheral surface, a first end adjacent to said handle, and a second end spaced outwardly from said handle, means defining a plurality of generally arcuately spaced, radially open grooves extending longituidnally on said outer peripheral surface of said heating element between said first end and said second end and being axially open at said second end, a plurality of longitudinally extending bars slidingly and removably engaged in said grooves through said open ends thereof and being in thermally conductive and heat exchanging relation with said heating element, said bar supporting radially extending hair grooming means, and fastening means constituting an auxiliary handle and being attachable to said second end of said heating element for preventing removal of said bars from said grooves while permitting free, unlimited, bidirectional selative rotation between said fastening means and said heating element.

4,695,705

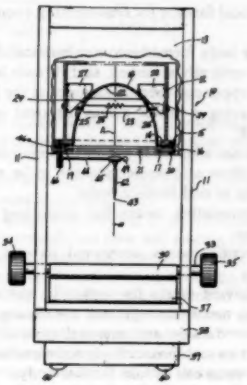
APPARATUS AND METHOD FOR LOCALIZED HEATING OF AN OBJECT AT PRECISE TEMPERATURES

Frank M. Kulig, Bloomfield, Conn., assignor to The J. M. Ney Company, Bloomfield, Conn.

Filed Feb. 14, 1986, Ser. No. 829,838

Int. Cl.[4] F24H *3/00;* **B23Q** *1/04*

U.S. Cl. 219—354 **6 Claims**

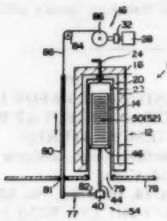


1. Apparatus for heating a workpiece to a predetermined temperature comprising a reflector having an axis with first and second focal points therealong; a source of radiant energy axially located substantially at first focal point within said reflector whereby said reflector reflects energy from said source to said second focal point; housing means supporting said reflector and source; a support assembly; means mounting said housing means on said support assembly in a fixed position; a platform movably supported on said support assembly below said housing for reciprocal movement along a vertical axis relative to said second focal point; means for vertically moving said platform on said support assembly relative to said housing along said vertical axis; a vertically extending probe member; an arm having one end pivotally mounted on said support assembly for pivotal movement in a plane normal to said vertical axis and carrying said probe member adjacent its other end, said probe member depending from said arm and having a free lower end locatable in a plane which essentially includes said second focal point, said arm being pivotable to move the free end of said probe member to a position in which it extends coaxially of said reflector and the free end of said probe member indicates said second focal point and to a second position wherein said arm and probe member are disposed outwardly of the radiant energy reflected from said reflector.

4,695,706
VERTICAL FURNACE FOR HEAT-TREATING SEMICONDUCTOR

Youichi Mizushina, Kawasaki, Japan, assignor to Denkoh Co. Ltd., Oume, Japan

Division of Ser. No. 686,231, Dec. 26, 1984, Pat. No. 4,610,628.
This application Jun. 9, 1986, Ser. No. 871,683
Claims priority, application Japan, Dec. 28, 1983, 58-201329; Nov. 6, 1984, 59-232397
Int. Cl.[4] H05B *3/62*; F27B *9/06, 9/20*
U.S. Cl. 219—390 5 Claims



1. A vertical furnace for heat-treating a semiconductor comprising:

a furnace body formed into a cylindrical shape and substantially vertically arranged, said furnace body being closed at the upper end thereof and open at the lower end thereof and having a heater means disposed on the inner wall thereof;

a boat means adapted to support a semiconductor thereon so as to allow said semiconductor to be subjected to heat-treating in said furnace body;

a boat supporting means for supporting said boat means thereon;

a connecting means connected to said boat supporting means;

a boat driving means for vertically moving said boat supporting means through said connecting means to permit the introduction and removal of said boat means with respect to said furnace body to be carried out through the lower open end of said furnace body;

an operation space defined below said furnace body so as to allow the charging and discharge operations of said semiconductor with respect to said boat means to be carried out in said operation space;

a separating means for airtightly isolating said operation space from a space around said furnace body, said separating means being arranged below said furnace body and formed with an opening positionally corresponding to the lower open end of said furnace body, said separating means also airtighly isolating said operation space from said boat driving means;

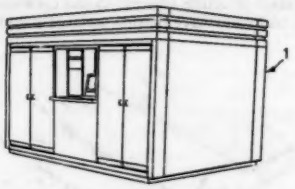
said connecting means including a vertically movable shaft vertically arranged so as to be laterally spaced from said furnace body and vertically movably extending through said separating means in an airtight manner and a supporting member fixedly mounted on the lower end of said vertically movable shaft to support said boat supporting means thereon; and

said boat driving means including a pulley arranged above said vertically movable shaft, a take-up roller arranged to be laterally spaced from said pulley, a wire or belt means stretched between the upper end of said vertically movable shaft and said take-up roller through said pulley so as to be wound up on said take-up roller as desired, and a motor for rotating said take-up roller.

4,695,707
HEATING OVEN

David N. Young, Glenrothes, Scotland, assignor to Keneticon Limited, Glenrothes, Scotland

Filed Aug. 12, 1985, Ser. No. 764,971
Claims priority, application United Kingdom, Oct. 6, 1984, 8425299
Int. Cl.[4] F24D *5/00, 11/00*
U.S. Cl. 219—392 4 Claims



1. A heating oven for testing of semiconductors comprising:

a heating chamber for receiving a plurality of containers, said containers having a first portion for receiving semiconductors to be tested and a second portion containing test control apparatus for said semiconductors;

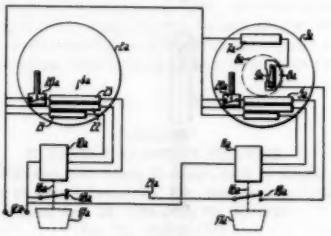
the chamber having a wall in the form of a heat barrier, said heat barrier defining apertures at spaced intervals to allow independent passage therethrough of each of said containers between a first position in which the portion for receiving semiconductors is fully out of the chamber and a second position in which the portion for receiving semiconductors is fully in the heating chamber;

wherein a portion of each said container intermediate said first and second portions porvides a closure which forms a heat barrier for a corresponding aperture in the second position of said container.

4,695,708
ELECTRIC COOKER

Felix Schreder, Oberderdingen, Fed. Rep. of Germany, assignor to E.G.O. Elektro Geräte Blanc u. Fischer, Fed. Rep. of Germany

Filed May 15, 1986, Ser. No. 863,600
Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3518124
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—486 11 Claims



1. An electric cooking unit, comprising:

at least two electric hotplates, each of said hotplates having at least one main heating resistor connected to associated leads for electrical power supply thereto;

manually-operable first and further power control devices for the electric hotplates, each of the power control devices being connected into the associated leads of said at least one main heating resistor of its respective electric

hotplate and being provided to control said electric hotplate in an operating level ranging between a maximum and a minimum;

at least one of the electric hotplates having an additional heating resistor connected to the associated leads for its electrical supply, for additional heating common with the main heating resistor of this electric hotplate during an initial cooking phase, said electric hotplate thereby defining an additional supplyable hotplate;

a temperature switch responsive to said additional supplyable hotplate, said temperature switch being connected to deenergize said additional heating resistor above a predetermined temperature of said additional supplyable hotplate;

a first contact for controlling the additional heating resistor, said first contact being provided for manual operation by operating the first power control device of the additional supplyable hotplate; and,

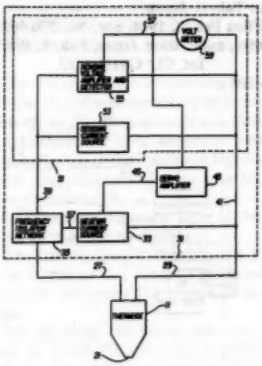
an additional second contact for controlling the additional heating resistor, said second contact being connected for operation by operating a further power control device and being thereby connected into the lead to the additional heating resistor of the additional supplyable hotplate.

4,695,709

METHOD AND APPARATUS FOR HEATING AND CONTROLLING THE TEMPERATURE OF ULTRA SMALL VOLUMES

Frederick Sachs; Anthony Auerbach, both of Buffalo; Richard G. McGarrigle, Snyder, and James E. Neil, Buffalo, all of N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Filed May 1, 1986, Ser. No. 858,386
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—494 **10 Claims**



1. An apparatus for heating, measuring, and controlling the temperature of an ultra small volume comprising:

a. an electrically non-conducting thin-walled microcapillary tube containing an electrically conductive material.

b. said microcapillary tube having an external coating of an electrically conductive material.

c. said electrically conductive materials meeting at one end of said microcapillary tube to form a heater-sensor portion jucture comprised of an area of electrical resistance along said juncture, said area of electrical resistance having a diameter between about 0.5 and about 5.0 microns, said heater-sensor portion having a heater portion and a heat-sensor portion.

d. means for applying an electrical current to said electrically conductive materials to heat said heater portion.

e. means for monitoring the electrical resistance of said heat-sensor portion to determine the temperature thereof, and

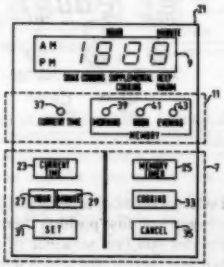
f. means for controlling the supply of electrical current to said heater-sensor portion.

4,695,710

ELECTRIC RICE COOKER WITH TIMER HAVING PLURAL MEMORY AREAS

Kiyoshi Yamashita, Aichi; Terutaka Aoshima, Toyohashi; Ryuuho Narita, and Masahiro Imai, both of Nagoya, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 28, 1986, Ser. No. 856,287
Claims priority, application Japan, Oct. 4, 1985, 60-222077
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—506 **12 Claims**



1. An electric rice cooker with a timer, comprising:

memory means for storing a plurality of cooking completion time data;

selection means for selecting a desired cooking completion time data from said memory means;

setting means for altering according to a user command, a selected cooking completion time and storing the altered cooking completion time in said memory means;

cooking start time means for calculating a cooking start time data by subtracting the value of a prescribed period of time from the value of the cooking completion time data;

timing means for producing current time data;

comparison means for comparing the cooking start time data with the current time data fed from said timing means, said comparison means outputting a coincidence signal when both the cooking start time data and the current time data coincide with one another;

display means for displaying one of the selected cooking completion time data and the current time data; and

cooking control means for executing a prescribed cooking program when receiving the coincidence signal from said comparison means.

4,695,711

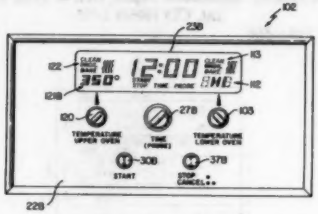
ELECTRICALLY OPERATED APPLIANCE CONTROLS AND METHODS OF MAKING THE SAME

Gram J. McGeorge, Spring Lake, Mich., assignor to Robershaw Controls Company, Richmond, Va.

Division of Ser. No. 685,775, Dec. 24, 1984, Pat. No. 4,636,621. This application Sep. 29, 1986, Ser. No. 912,968
The portion of the term of this patent subsequent to Jan. 13, 2004, has been disclaimed.
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—506 **20 Claims**

1. In an electrically operated appliance control comprising an electrically operated device for providing various modes of operation thereof, an electrically operated visual display unit, and a manually operated selector means electrically interconnected to said device and said unit for selecting a desired mode of operation of said device and for setting said device to pro-

vide that selected mode in a desired set manner thereof as being indicated on said display unit by such operation of said selector means, said selector means having a manually operated start actuator which when actuated will cause said device to begin to produce the selected mode of operation thereof and in that selected set manner thereof, the improvement wherein said selector means comprises a manually movable selector member which when moved in one direction a certain amount from an off position thereof to a first position thereof first selects one of said modes of operation and then sets said device to provide that selected mode of operation in a desired manner from a first sequence of operations thereof as being indicated on said display unit as said selector member is being further moved in said one direction between said first position thereof thru a certain distance that provides said first sequence of operations and a certain second position thereof and which when moved in said one direction to said second position thereof selects another mode of operation thereof and then sets said device to provide that other selected mode of operation in a desired manner from a second sequence of operations thereof as being indicated on said display unit as said selector member is being further moved in said one direction beyond said second position thereof thru a certain distance that provides said second sequence of operations.



4,695,712

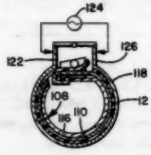
FLEXIBLE AUTOREGULATING HEATER WITH A LATCHING MECHANISM

Paul F. Busch, Los Altos Hills, Calif., assignor to Metcal, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 507,919, Jun. 27, 1983, abandoned. This application Mar. 6, 1984, Ser. No. 586,712

Int. Cl.[4] H05B *3/58*

U.S. Cl. 219—535 **26 Claims**



1. An autoregulating heater comprising

a flexible, relatively flat, elongated, autoregulating heater strap having at least a first thin elongated member of ferromagnetic material,

means for securing said heater strap in a band about a workpiece to be heated, and

means for developing an alternating current in said strap sufficient to cause its temperature to approach the Curie temperature of said ferromagnetic material.

4,695,713

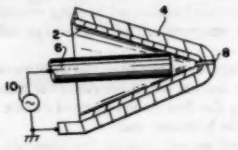
AUTOREGULATING, ELECTRICALLY SHIELDED HEATER

John F. Krumme, Woodside, Calif., assignor to Metcal, Inc., Menlo Park, Calif.

Continuation-in-part of Ser. No. 430,317, Sep. 30, 1982, abandoned. This application Oct. 19, 1983, Ser. No. 543,443

Int. Cl.[4] H05B *3/10*

U.S. Cl. 219—553 **16 Claims**



1. An element for an autoregulating heating device comprising:

a laminated structure having at least a first lamina and a second lamina, both being a material having a high magnetic permeability,

said first lamina being of a material having a lower Curie Temperature than said second lamina,

said laminae being in electrical contact along their adjacent surfaces.

4,695,714

LIGHT SOURCE STABILIZER WITH INTENSITY AND TEMPERATURE CONTROL

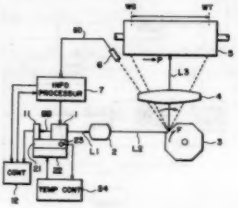
Junichi Kimizuka, Yokohama; Yukihide Ushio, Tokyo, and Kaoru Seto, Chigasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1984, Ser. No. 576,402

Claims priority, application Japan, Feb. 8, 1983, 58-18065

Int. Cl.[4] G01U *1/32*

U.S. Cl. 250—205 **13 Claims**



1. A light source stabilizer comprising:

light emitting means;

heating means for heating said light emitting means;

temperature sensing means for sensing a temperature of said light emitting means;

temperature control means for controlling said heating means in accordance with the output of said temperature sensing means, wherein said temperature control means sets the control temperature to be approximately equal to the highest ambient temperature of said light emitting means;

light intensity detection means for detecting light intensity of said light emitting means; and

light intensity control means for controlling the light intensity of said light emitting means in accordance with the output of said light intensity detection means, wherein said light intensity control means effects control of the light intensity of said light emitting means after the tem-

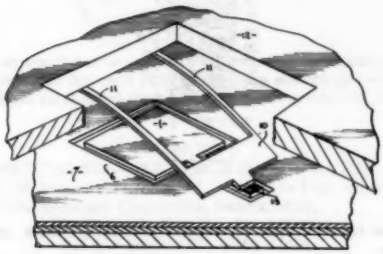
perature sensed by said temperature sensing means reaches the control temperature.

4,695,715

INFRARED IMAGING ARRAY EMPLOYING METAL TABS AS CONNECTING MEANS

Robert E. Maim, Pacific Palisades, Calif., assignor to Northrop Corporation, Hawthorne, Calif.

Filed Dec. 12, 1985, Ser. No. 808,209
Int. Cl.[4] H01J 40/14
U.S. Cl. 250—211 J **7 Claims**



1. An infrared imaging device comprising
a semiconductor substrate,
an insulating layer disposed on one side of said substrate,
a plurality of discrete electrodes formed and laid on said insulating layer, said electrodes being substantially transparent to infrared radiation,
a second substrate,
a plurality of integrating capacitors disposed on a second substrate mounted in alignment over the semiconductor substrate so that the electrodes and integrating capacitors are in general aligned positions to coincide with each other,
a plurality of means for connecting each electrode to a respective one of said capacitors to a charging voltage and for thereafter discharging each said electrode, the charge so accumulated on each capacitor being related to the charge collected at the insulating layer-substrate interface beneath the electrode due to interaction by radiation passing therethrough,
means for creating a depletion layer in the substrate and for floating each of the electrodes,
means for reading out each detector by measuring the amount of charge that needs to be placed on the electrode to partially discharge the electrode to a predetermined voltage,
means for adjusting the initial electrode voltage and the voltage to which the electrode is partially discharged to obtain an approximately linear relationship between the charge which is transferred to the electrode and the amount of charge which is accumulated the insulating layer-substrate interface beneath the electrode due to incident radiation.

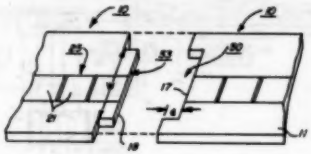
4,695,716

IMAGE SENSOR ARRAY FOR ASSEMBLY WITH LIKE ARRAYS TO FORM A LONGER ARRAY

Jagdish C. Tandon, Fairport, and Mehdi N. Araghi, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 808,797, Dec. 13, 1985, Pat. No. 4,668,333. This application Oct. 27, 1986, Ser. No. 923,516
Int. Cl.[4] H01V 40/14
U.S. Cl. 250—211 R **1 Claim**

1. A sensor array adapted for assembly with other like arrays to provide a longer array, comprising;
(a) a (110) silicon chip;
(b) at least one row of photosites on said chip, the boundaries of said photosites being parallel to the (111) planes of said chip whereby said photosites are generally in the shape of a parallelogram;
(c) the opposing ends of said chip being uniformly smooth and parallel to said chip (111) planes whereby the ends of said chip extend at an acute angle to the axis of said row of photosites so that said chip has a generally parallelogram shape complementary to said photosites;



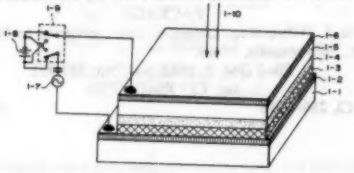
(d) each end of said chip being formed along a line passing along the boundary between adjoining photosites so that the photosites at the border of each end of said chip are unimpaired and the same size as the other photosites in said row of photosites whereby said chip may be assembled with other like chips by bringing said chip ends into abutting engagement with the ends of adjoining chips with the photosite row of said chip being aligned with the photosite rows of said adjoining chips.

4,695,717

SEMI-CONDUCTOR DEVICE AND ELECTRONIC APPARATUS USING THE SAME

Yutaka Hirai, Tokyo; Masahiro Haruta, Funabashi; Yukuo Nishimura, Sagamihara; Hiroshi Matsuda, Yokohama, and Takashi Nakagiri, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1985, Ser. No. 725,497
Claims priority, application Japan, Apr. 24, 1984, 59-81091; May 16, 1984, 59-96374; May 16, 1984, 59-96372
Int. Cl.[4] H01J 31/50
U.S. Cl. 250—213 R **15 Claims**



1. A display device which comprises a laminated structure of a photoconductive layer, a charge-retaining layer and a display layer which are provided between two electrophotoconductive films, the charge-retaining layer being provided between the photoconductive layer and the display layer, at least one of the two electroconductive films being transparent.

4,695,718

PROTECTIVE LIGHT FILTER SYSTEM FOR IMAGE INTENSIFIER

James M. Dill, Pompano Beach, Fla., assignor to EOL_3 Company, Inc., Fort Lauderdale, Fla.

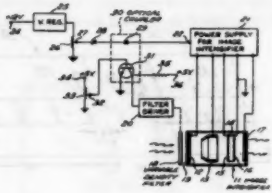
Filed Jul. 9, 1986, Ser. No. 883,636
Int. Cl.[4] H01J 31/50
U.S. Cl. 250—213 VT **6 Claims**

1. In combination with an image intensifier having a photo-

cathode for receiving incident light and a power supply for said image intensifer,

a variable density light filter controlling the level of the incident light received by said photocathode;

a current-amplifying optical coupler having a current-conducting light emitting device operatively connected in said power supply to emit light which changes in accordance with changes in the power supply current, and a



light sensing current-producing device optically coupled to said light emitting device to produce current which changes in accordance with changes in the light output from said light emitting device;

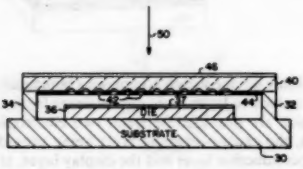
and a filter driver operatively connected between said light sensing device and said filter to operate said filter to control the incident light input to said photocathode in inverse relation to the current produced by said light sensing device.

4,695,719

APPARATUS AND METHOD FOR OPTO-ELECTRONIC PACKAGE

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 5, 1983, Ser. No. 557,972
Int. Cl.⁴ E04G *17/06*
U.S. Cl. 250—216 **19 Claims**



1. In the process of making an opto-electronic package for ranging devices having a substrate, a die with electronic components and radiation detectors thereon, a plurality of lenslets with a mask therebetween mounted adjacent the die and a transparent cover adjacent the lenslets and mask and attached to the substrate so that radiation is directed by the lenslets to the detectors and not the electronic components, the improvement comprising:

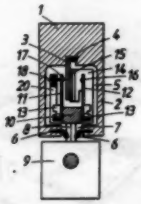
constructing the lenslets in the cover on one side.

4,695,720

OPTOELECTRONIC INCREMENTAL MEASURING SYSTEM WITH ADJUSTABLE LED POSITIONING

Heinz Rieder, St. Pantaleon, and Max Schwaiger, Ostermiething, both of Austria, assignors to EMR Elektronische Mess- und Regelgerate Gesellschaft m.b.H., Tarsdorf, Austria

Filed Dec. 5, 1985, Ser. No. 805,850
Claims priority, application Austria, Dec. 5, 1984, 3856/84
Int. Cl.⁴ G01D *5/34*
U.S. Cl. 250—231 SE **6 Claims**



1. An optoelectronic incremental measuring system, comprising:

a scale member provided with an incremental scale having a plurality of predetermined scale increments; and

a scanning unit mounted for relative movement of said unit and said scale member along said scale, said scanning unit comprising:

a plurality of scanning grids spaced apart along said scale by a distance which is an integral multiple and a fractional part of one scale increment,

a plurality of optoelectronic receivers each associated with a respective one of said grids,

a support,

a printed circuit board of a flexibly resilient material,

a plurality of light-emitting diodes mounted on said printed circuit board, each of said light-emitting diodes being positioned to cooperate with a respective one of said grids and a respective one of said receivers for emitting light which is detected by the respective receiver and is modulated by said scale and the respective grid upon said relative movement, said receivers generating relatively phase-displaced sine signals having periods which correspond in number to a number of said scale increments swept by said scanning unit upon said relative movement, and

means for individually adjusting positions of said light-emitting diodes relative to said support by deforming said printed circuit board in a region at which the respective light-emitting diode is mounted thereon for adjusting said signals relative to one another.

4,695,721

SURFACE TEXTURE RECOGNITION USING MULTI-DIRECTIONAL SCANNING

Emmet M. Fulkerson, Cincinnati; Ralph M. Somers, West Chester, both of Ohio, and Diana R. Compton, Bloomington, Ind., assignors to General Electric Company, Cincinnati, Ohio

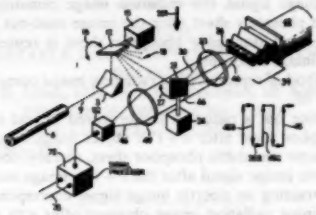
Filed Dec. 26, 1985, Ser. No. 813,360
Int. Cl.⁴ G06K *9/30*
U.S. Cl. 250—234 **6 Claims**

1. Apparatus for obtaining information from a surface, comprising:

(a) means for scanning a light beam along a path on the surface;

(b) means for successively sensing reflected light at a plural-

ity of path locations within each pixel on the surface and for generating an intensity signal for each location; and



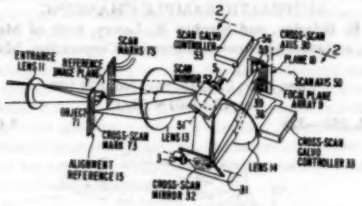
(c) means for arranging the intensity signals successively generated for each pixel into groups and for deriving a single pixel signal from each group of intensity signals.

4,695,722

OPTICAL SCANNER ERROR COMPENSATOR

Wesley D. Motooka, Irvine, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Apr. 25, 1986, Ser. No. 855,974
Int. Cl.[4] H04N *1/04*; G01B *11/26*
U.S. Cl. 250—235 **10 Claims**



1. Apparatus for compensating for errors introduced into an optical scanning system, said apparatus comprising:

a reference plane comprising an object to be projected;

a detector, lying in a detector plane, for converting the object into electrical signals;

means for optically scanning the object onto the detector;

lying in the reference plane, an elongated reference mark;

lying in the detector plane, a first optical displacement sensor generating a first error compensation signal proportional to the degree of linear misalignment between said first optical displacement sensor and the projection of the reference mark thereonto, and hence the misalignment between the object and the detector, along a first axis; and

means for controlling said optical scanning means in accordance with said first error compensation signal in order to compensate for said misalignment.

4,695,723

CORONA-CHARGING APPARATUS

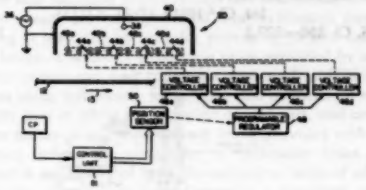
James C. Minor, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 10, 1985, Ser. No. 744,079
Int. Cl.[4] G03G *15/02*; H01T *19/00*
U.S. Cl. 250—325 **3 Claims**

1. In corona-charging apparatus having corona electrode means for charging successive image segments of a moving charge-receiving element such that the charging rate from an image segment to the next may be adjusted in the transition region between the trailing edge of one image segment and the leading edge of the next image segment, the improvement comprising:

a composite grid including a plurality of conductive control grid sets with at least one grid wire per set between the electrode means and the charge-receiving element, and extending in a direction transverse to the direction of movement of the charge-receiving element,

control means for adjusting the voltage of each of said grid sets independently of other grid sets to cause corona discharge to effect a predetermined charge on the portion of



the charge-receiving element aligned with each grid set, and

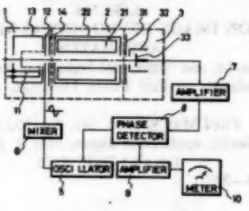
regulator means for said control means synchronized with the movement of the charge-receiving element such that the voltages of said control grid sets are adjusted respectively when the control grid set is aligned with the transition region of the charge-receiving element.

4,695,724

AC-MODULATION QUADRUPOLE MASS SPECTROMETER

Fumio Watanabe, Fukushima; Shojiro Komaki, Tokyo; Masao Miyamoto, Tokyo, and Takao Ito, Tokyo, all of Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan

Continuation of Ser. No. 658,481, Oct. 9, 1984, abandoned. This application Nov. 24, 1986, Ser. No. 935,097
Claims priority, application Japan, Oct. 14, 1983, 58-192112
Int. Cl.[4] B01D *59/44*
U.S. Cl. 250—292 **9 Claims**



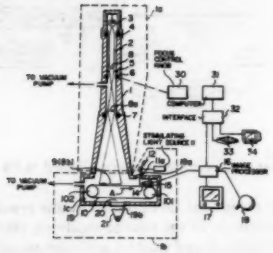
1. A quadrupole mass spectrometer comprising: ion generating means for generating an ionized particle stream; modulating means coacting with the ion generating means for modulating the ionized particle stream with an AC voltage to produce a frequency-modulated ionized particle stream, the modulating means including an oscillator for producing a frequency signal, and a mixer connected to receive the frequency signal from the oscillator for producing therefrom the AC voltage; quadrupole analyzing means for receiving and analyzing the frequency-modulated ionized particle stream; detecting means for receiving the analyzed frequency-modulated ionized particle stream and detecting therefrom a modulated ion current signal; and synchronizing means for receiving the frequency signal and the modulated ion current signal and synchronizing the frequency signal with the modulated ion current signal to produce a DC voltage output signal representative of the level of the modulated ion current signal analyzed by the quadrupole analyzing means.

4,695,725

METHOD OF DETECTING A FOCUS DEFECT OF AN ELECTRON MICROSCOPE IMAGE

Nobufumi Mori; Yuichi Hosoi; Kenji Takahashi, and Junji Miyahara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Dec. 9, 1985, Ser. No. 806,466
Claims priority, application Japan, Dec. 10, 1984, 59-260517; Apr. 12, 1985, 60-78079
Int. Cl.[4] H01J *37/21, 37/153*
U.S. Cl. 250—327.2 10 Claims



1. A method of detecting a defocus value of an image produced by an electron microscope, comprising the steps of:

(i) exposing a two-dimensional image sensor under vacuum to an electron beam having passed through a specimen to enable said two-dimensional image sensor to store the energy of the electron beam;

(ii) applying stimulating energy to said two-dimensional image sensor to discharge the stored energy as light;

(iii) photoelectrically detecting the light discharged from said two-dimensional image sensor to produce an image signal; and

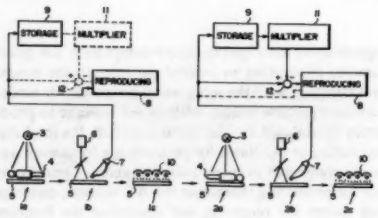
(iv) computing the defocus value of the image based on said image signal.

4,695,726

RADIATION IMAGE REPRODUCING METHOD AND APPARATUS

Hideo Watanabe, and Nobuyoshi Nakajima, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 9, 1985, Ser. No. 732,210
Claims priority, application Japan, May 9, 1984, 59-92628
Int. Cl.[4] G03C *5/16*
U.S. Cl. 250—327.2 5 Claims



1. A method of reproducing a radiation image in a radiation image recording and reproducing system in which object image recording is conducted by exposing a stimulable phosphor sheet to a radiation passing through an object to have a radiation image of the object stored in the stimulable phosphor sheet, image read-out is conducted by scanning the stimulable phosphor sheet carrying the radiation image stored therein by stimulating rays which cause the stimulable phosphor sheet to emit light in proportion to the stored radiation energy and by photoelectically detecting the emitted light to obtain an electric image signal, a visible image is reproduced by use of the electric image signal, the radiation image remaining in the stimulable phosphor sheet after the image read-out is erased, and the erased stimulable phosphor sheet is reused for the radiation image recording,

the method of reproducing a radiation image comprising the steps of:

(i) reading out a radiation image stored in said stimulable phosphor sheet after n+1'th object image recording on the same stimulable phosphor sheet, thereby obtaining an electric image signal after the n+1'th image recording,

(ii) subtracting an electric image signal corresponding to a remaining radiation image obtained after n'th image recording from said electric image signal after the n+1'th image recording, said electric image signal corresponding to said remaining radiation image being determined in accordance with recording and read-out conditions, in accordance with erasing conditions at erasing of an n'th recorded image, and further in accordance with a type of stimulable phosphor sheet employed, and

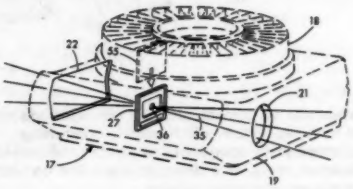
(iii) reproducing a visible image only of a radiation image recorded by the n+1'th image recording on the basis of an electric image signal obtained by said step(ii).

4,695,727

OPTICAL ANALYTICAL INSTRUMENT WITH AUTOMATIC SAMPLE CHANGING

Philip R. Brierley, and Stephen R. Lowry, both of Madison, Wis., assignors to Nicolet Instrument Corporation, Madison, Wis.

Filed Mar. 7, 1986, Ser. No. 837,608
Int. Cl.[4] G01N *21/35*
U.S. Cl. 250—328 9 Claims



1. An anlaytical instrument for use in infrared spectroscopy comprising:

(a) a housing with walls therein defining a sample chamber, including a wall on one side of the chamber having an inlet opening therein and a wall on the other side of the chamber having an outlet opening therein, a beam path being defined between the inlet and outlet openings within the sample chamber;

(b) an infrared detector and optical elements within the housing arranged to receive an incoming beam of infrared radiation from a source and to direct the beam of radiation across the beam path between the inlet and outlet openings in the sample chamber walls and onto the detector;

(c) slide projector apparatus having a magazine adapted to hold a plurality of sample holders each having substantially the dimensions of a photometric transparency slide with which the slide projector apparatus is adapted to be used, and further including means therein for selectively transporting a single sample holder at a time from the magazine to a slide viewing position away from the magazine, the projector apparatus being free of obstructions in an optical path therethrough which extends from an entrance opening to an exit opening in the projector apparatus and which includes the slide viewing position; and

(d) means for mounting the projector apparatus within the sample chamber of the housing such that the projector

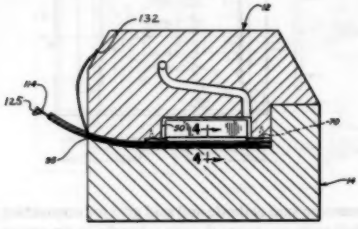
apparatus is located with the slide viewing position interposed in the beam path and with the beam path passing unimpeded through the projector apparatus.

4,695,728

PORTABLE RADIATION CONTAMINATION DETECTOR

Terrence R. Gibes, 1214 Illini Dr., Lockport, Ill. 60441

Filed Feb. 26, 1986, Ser. No. 833,011
Int. Cl.[4] G01J *1/00*; G01F *23/00*
U.S. Cl. 250—336.1 **8 Claims**



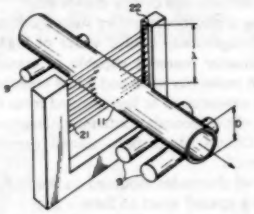
1. A radiation detecting apparatus comprising a shielded container made of radiation resisting material, said container having at least two shield components, one of said components having a protruding section, the other component having a receding section for receiving said protruding section, said protruding and receding sections having configured wall surfaces spaced from each other and defining therebetween a curvilinear slot, a chamber in one of said components communicating with said slot, a detector disposed in said chamber, a slide retainer disposed in said slot, and means connected to said detector for providing radiation detecting reading of material inserted into said slide retainer.

4,695,729

TUBULAR PART WALL THICKNESS MEASURING DEVICE

Asao Monno, Kanagawa; Kiyoo Watanabe, and Kazuyuki Kaneko, both of Tokyo, all of Japan, assignors to Fuji Electric Co., Ltd. and Fuji Facom Corporation and Kawasaki Steel Corporation, both of, Japan

Continuation of Ser. No. 515,230, Jul. 19, 1983. This application May 27, 1986, Ser. No. 868,895
Int. Cl.[4] G01N *23/08*
U.S. Cl. 250—358.1 **1 Claim**



1. A device for measuring the wall thickness of a tubular part, comprising:

radiation source means;

radiation detector means disposed in spaced apart aligned relation with respect to said source means, to accommodate a tubular part therebetween, the length of said detector means being at least as large as the length of said radiation source means, and a width of a radiation beam from said radiation source means being substantially larger than a diameter of said tubular part, said tubular part comprising a continuously or intermittently vibrating element, and said radiation source means and said radiation detector means providing a gap therebetween, said gap having a length in a transverse direction larger than said diameter of said tubular part in said transverse direction, and

wherein said radiation source means and said radiation detector means are each provided with collimator means having at least one opening for providing parallel radiation beams, a width of a radiation beam provided by said source means and said collimator means of said source means being sufficiently larger than said diameter of said tubular part to allow for vibration of said part, said collimator means of said source means being provided with an opening defined by a plurality of collimator holes arranged in a plurality of lines, the collimator holes of adjacent ones of said lines being formed in a staggered relationship; and

a transverse gap defined by said source means, said detector means, said collimator means of said source means, and said collimator means of said detector means having a length sufficiently larger than said diameter of said tubular part to allow for vibration in said transverse direction; the length of said detector means being at least larger than the length of said opening of said detector collimator means; and

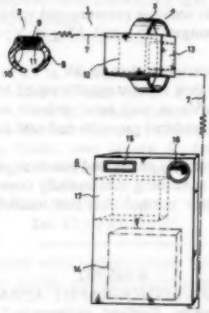
wherein said radiation detector means provides an output for determining an average wall thickness of said tubular parts.

4,695,730

LOCAL RADIATION EXPOSURE ALARM APPARATUS

Kimio Noda, Ibaraki; Kiyoshi Ozeki, Chiba; Hiroaki Furukawa, Ibaraki, and Katsunori Watai, Kanagawa, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan and Ohyo Koken Kogyo Co., Ltd., both of Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,793
Claims priority, application Japan, Sep. 17, 1984, 59-192497
Int. Cl.[4] G01T *1/24*
U.S. Cl. 250—370 **6 Claims**



1. An exposure alarm apparatus comprising:

a detector unit having a semiconductor element sensitive to gamma radiation, a filter for improving an energy characteristic of said semiconductor element, and a cushion material for embedding therein said semiconductive element, said detector unit being formed in the shape of a finger ring having a body portion so that said detector unit can be removably adapted to a finger of an operator, said semiconductor element, filter and cushion material being embedded in said body portion;

a preamplifier unit electrically connected to said semiconductor element, said preamplifier unit having first means

for selectively encasing said detector unit, and a strap for removably engaging said amplifier unit to the operator; and

a measuring unit electrically connected to said preamplifier unit, said measuring unit having second means for selectively encasing said preamplifier unit, and a clip device for removably engaging said measuring unit to the operator.

4,695,731

IONIZATION CHAMBER

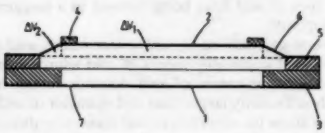
Keith J. Larkin, Uckfield, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 2, 1985, Ser. No. 762,008

Claims priority, application United Kingdom, Sep. 10, 1984, 8422786

Int. Cl.⁴ G01T *1/185*

U.S. Cl. 250—374 **14 Claims**



1. A device for measuring intensity of a beam of ionizing radiation comprising

a closed chamber having at least one flexible wall through which ionizing radiation is passed,

an ionizable gas completely contained in said closed chamber at an ambient pressure, said gas having a total volume of V_T, and

two opposing electrodes contained in said closed chamber, one of said two electrodes being disposed on said flexible wall, said two electrodes having an applied potential difference for producing an ionization current from said ionizing radiation,

said two electrodes defining an active region therebetween having a volume V_A, said volume V_A being less than V_T, said ionization current flowing in said active region,

wherein said volume V_T and said volume V_A both vary with changes in ambient pressure and in ambient temperature, said changes in ambient pressure and ambient temperature producing changes ΔV_T and ΔV_A in V_T and V_A respectively,

wherein a proportional change $\Delta V_A/V_A$ in said volume of said active region is substantially equal to a proportional change $\Delta V_T/V_T$ in said total volume within operating ranges of said ambient pressure and said ambient temperature, and

wherein said ionizable gas in said active region has a weight per unit area remaining substantially constant when measured in a plane normal to a line intersecting said electrodes.

4,695,732

ELECTRON LITHOGRAPHY APPARATUS

Rodney Ward, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

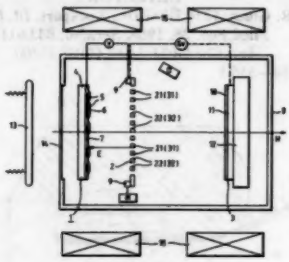
Filed May 6, 1985, Ser. No. 730,885

Claims priority, application United Kingdom, May 18, 1984, 8412698

Int. Cl.⁴ H01J *37/00, 37/30*

U.S. Cl. 250—492.2 **7 Claims**

1. An electron image projector for projecting with substantially unity magnification a beam of electrons emitted by a cathode onto a target under the action of a substantially uniform electric field wherein the beam of electrons has a predetermined spatial pattern which extends transversely to the electric field, the projector comprising an electron emissive cathode, an anode comprising a grid having a plurality of mutually parallel slats, each pair of parallel slats being spaced apart along their entire lengths by electron permeable regions, the grid being disposed intermediate and parallel to the cathode and the target and the area of slats and regions being large enough that said beam is interrupted over its entire spatial pattern only by said parallel slats, an electric field voltage



source, means on said cathode and said grid for connecting said electric field voltage source thereto whereby in operation said uniform electric field is produced between the cathode and the anode grid, the projector further comprising means for producing a substantially uniform magnetic field parallel to the electric field to focus the patterned beam of electrons onto the target.

4,695,733

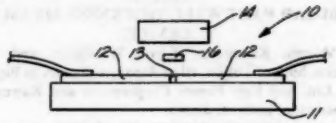
PHOTOCONDUCTIVE POWER SWITCH

Philip Pesavento, 1622 6th St., Manhattan Beach, Calif. 90266

Filed Oct. 17, 1984, Ser. No. 661,938

Int. Cl.⁴ H03K *3/42*; H01L *27/14*

U.S. Cl. 250—551 **7 Claims**



1. A method for producing an electrical pulse of at least about 10 amperes and about 100 volts at a switching speed of about one nanosecond or less comprising:

providing a photoconductive switch comprising:

non-cryogenically cooled wafer of high resistivity semiconductor material capable of transistion between a high resistivity state and a low resistivity state in about one nanosecond or less selected from the group consisting of compounds containing elements from Group III to Group V, carbon, silicon carbide and mixtures thereof;

a pair of electrodes mounted on the wafer, said electrodes being spaced apart to form a gap;

a high powered multiple stripe diode laser capable of emitting light having an energy at least as great as the band gap of the semiconductor material at an intensity of at least 50 picojoules; and

means for directing light emitted from the diode laser onto the gap;

applying a bias voltage of at least about 100 v across the gap; and

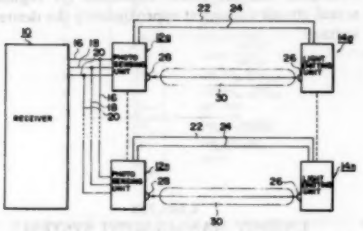
activating the diode laser to thereby generate an electrical pulse of at least about 10 amperes and about 100 volts.

4,695,734

PHOTOELECTRIC SMOKE SENSOR INCLUDING A PHOTOSENSING DATA CORRECTION RATIO CORRECTION CIRCUIT

Hiroshi Honma, Tokyo, and Junichi Narumiya, Kanagawa, both of Japan, assignors to Hochiki Corporation, Tokyo, Japan

Filed Feb. 20, 1985, Ser. No. 703,385
Claims priority, application Japan, Mar. 5, 1984, 59-31476[U]
Int. Cl.[4] G01N 15/06; G08B 17/10
U.S. Cl. 250—573 5 Claims



1. A photoelectric smoke sensor in which a light emitting unit and a photo sensing unit are arranged to face each other a predetermined distance away from each other, wherein a pulse light emitted from said light emitting unit, which has been attenuated due to smoke, is received by said photo sensing unit, thereby detecting a fire, comprising:

a storage means for storing photo sensing data when a power source is turned on as initial photo sensing data;

a correction ratio correcting means for comparing at every predetermined fouling correction period the photo sensing data at that time with said initial photo sensing data and, when a difference is noted between said data, for correcting a correction ratio in accordance with said difference;

a correction operating means for inputting the photo sensing data that is derived at every predetermined period shorter than said correction period as is and for obtaining correction photo sensing data due to a multiplication with the correction ratio at that time used as a multiplier; and

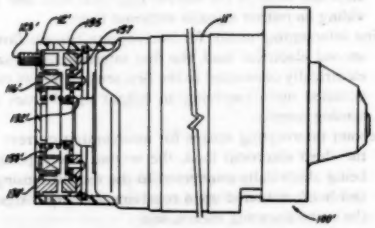
a smoke discriminating means for discriminating a fire on the basis of said correction photo sensing data

4,695,735

ENGINE STARTER DRIVE WITH INTEGRAL STARTER RELAY

John R. Tallis, Jr., Horseheads, and Nicholas A. Volino, Elmira, both of N.Y., assignors to Facet Enterprises, Inc., Tulsa, Okla.

Filed May 30, 1986, Ser. No. 868,448
Int. Cl.[4] F02N 11/00; H02P 9/00; H02K 1/06
U.S. Cl. 290—38 R 10 Claims



1. A starter drive for starting an internal combustion engine, said starter drive comprising:

a starter housing having a first end and a second end;

an electric motor positioned within said starter housing;

a drive shaft that is connected to said electric motor to be driven thereby, said drive shaft carrying advancing starting means for advancing by the rotation of said drive shaft toward said second end of said starter drive into starting engagement with the internal combustion engine to be started; and

solenoid means for selectively delivering electrical power to said electric motor, said solenoid means being mounted to said starter housing at said first end thereof, said solenoid means comprising:

a housing member;

a first terminal attached to said housing member, said first terminal being adapted to be connected to a source of electric power;

a second terminal attached to said housing member and being spaced apart from said first terminal, said second terminal being electrically connected to said electric motor;

a translatable annular armature positioned within said housing member and being translatable within said housing member between a first position and a second position;

biasing means normally biasing said translatable annular armature member toward one of said first position and said second position;

a solenoid coil positioned within said housing member, said solenoid coil being electrically connected to said first terminal and being adapted to be electrically energized when said first terminal is connected to said source of electric power, said solenoid coil, when electrically energized, creating an electromagnetic force that translates said translatable annular armature toward the other of said first position and said second position; and

contact means connected to said translatable annular armature and translatable therewith, said contact means electrically connecting siad first terminal and said second terminal to one another when said translatable annular armature has been translated toward said other of said first position and said second position, said first terminal and said second terminal being electrically disconnected from one another when said translatable annular armature is in said one of said first position and said second position.

4,695,736

VARIABLE SPEED WIND TURBINE

Glidden S. Doman, Granby, Conn.; Joseph M. Kos, Holyoke, Mass.; Kermit I. Harner, Windsor, Conn.; Eugene D. DiValentin, Enfield, Conn., and Henry S. Healy, Bloomfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Nov. 18, 1985, Ser. No. 799,045
Int. Cl.[4] F03D 9/02
U.S. Cl. 290—44 8 Claims

1. A variable speed wind turbine system having an optimum power coefficient versus velocity ratio performance curve, comprising:

a turbine rotor shaft with a hub at one end with at least one blade attached to the hub;

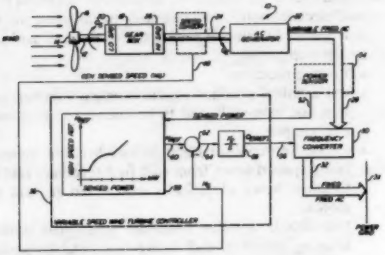
a gearbox, having a low speed side thereof attached to the other end of the turbine rotor shaft;

an AC generator, having a generator rotor shaft attached to a high speed side of the gearbox, the generator providing variable frequency AC at a power output line thereof;

sensing means, for sensing generator speed and generator electrical power output and for providing sensed signals indicative thereof;

a variable speed wind turbine controller, responsive to the sensed signals indicative of generator speed and generator electrical power output, for providing a generator torque

command signal for commanding maneuvers of the generator speed according to a function defining generator speed versus generator electrical power output which manuevers tend to cause the wind turbine to operate substantially on the wind turbine power coefficient versus velocity ratio optimum performance curve substantially at the peak thereof; and



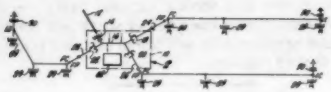
a frequency converter, electrically connected to the generator power output line and responsive to the generator output AC for converting the variable frequency AC to constant frequency AC, the frequency converter responsive to the generator torque command signal for controlling the magnitude of power flow through the converter, thereby effecting control of the generator torque.

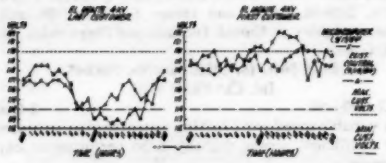
4,695,737

MICROCOMPUTER CONTROLLED POWER REGULATOR SYSTEM AND METHOD

Joe D. Rabon, Hacienda Heights, and Rudy Haro, Alta Loma, both of Calif., assignors to Southern California Edison, Rosemead, Calif.

Filed Mar. 19, 1986, Ser. No. 841,317
Int. Cl.[4] H02J 3/00
U.S. Cl. 307—31 **25 Claims**





1. A method for operating an A.C. power distribution substation for centralized control of a plurality of distribution circuits, each circuit having regulator means and associated control means for connecting a common voltage to first and second sides of drive means for selectively raising and lowering

(a) regulator voltage of the circuit, the method comprising the steps of:

(b) sensing the regulator voltage;

(c) sensing an output current of the regulator means;

(d) repetitively producing digital voltage and current data corresponding to the sensed regulator voltage and output current;

(e) determining, based on the voltage and current data, and actual circuit voltage and a change in the output current;

(f) detecting whether the actual circuit voltage is within a deadband about a desired circuit voltage, the deadband being variably offset with respect to the desired circuit voltage in response to the change in the output current for selectively producing a raise command and a lower command; and

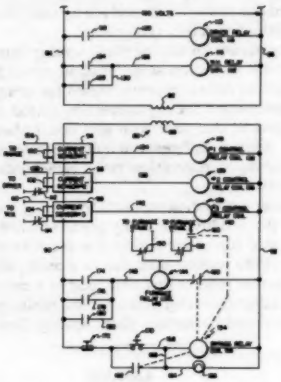
(g) selectively driving the first and second sides of the drive means to the common voltage in response to the raise command and the lower command for regulating the actual circuit voltage at approximately the desired circuit voltage.

4,695,738

ENERGY MANAGEMENT SYSTEM

Daniel Wilmot, 8005 Dennison-Ashtabula, Cortland, Ohio 44410

Filed Sep. 30, 1985, Ser. No. 781,946
Int. Cl.[4] H02J 3/00
U.S. Cl. 307—31 **16 Claims**



1. An energy management system for controlling a plurality of electrical loads, the electrical loads having first, second, and third priorities of use, respectively, comprising:

first sensing means for sensing currenrt flow in the first electrical load and for providing an output signal in response thereto;

second sensing means for sensing current flow in the first electrical load or the second electrical load and for providing an output signalin response thereto;

first interrupting means for interrupting current flow in the second electrical load, the first interrupting means being electrically connected to the first sensing means and being actuated upon receiving an output signal from the first sensing means;

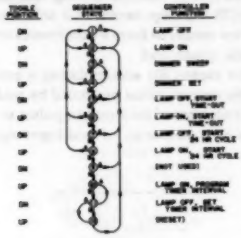
second interrupting means for interrupting current flow in the third electrical load, the second interrupting means being electrically connected to the second sensing means and being actuated upon receiving an output signal from the second sensing means; and

a step-down transformer, the output side of the transformer being electrically connected to each of the sensing means and the interrupting means.

4,695,739
MULTI-FUNCTION SWITCH-CONTROLLED LAMP CIRCUIT

Lyle R. Pierce, P.O. Box 19387, Portland, Oreg. 97219

Filed Oct. 18, 1985, Ser. No. 788,924
Int. Cl.[4] H01H *43/00*; G05B *19/10*
U.S. Cl. 307—141 14 Claims



1. In an electrical circuit including a power source, a load and a single-pole, single-throw switch for normally controlling the application of power to the load, a function controller connected in series with said load and also connected to said switch, said function controller being actuated by a predetermined number of changes of state of said switch to provide auxiliary functions for said electrical circuit wherein each auxiliary function is implemented as a result of the number of times said switch changes state.

8. In an electrical circuit including a power source, a load and a single-pole, single-throw switch for normally controlling the application of power to the load, a function controller comprising:

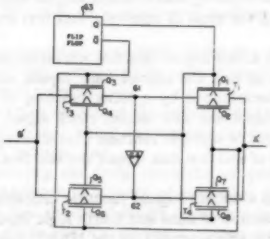
(a) delay timer means responsive to each change of state of said switch for providing a timing signal of predetermined duration, said timing signal being initiated each time said switch changes state; and

(b) encoder means responsive to each change of state of said switch and to a delay signal from said delay timer means for providing a circuit function control signal.

4,695,740
BIDIRECTIONAL BUFFER AMPLIFIER

William S. Carter, Santa Clara, Calif., assignor to Xilinx, Inc., San Jose, Calif.

Filed Sep. 26, 1984, Ser. No. 655,008
Int. Cl.[4] H03K *17/56*; H04B *3/38*
U.S. Cl. 307—242 6 Claims



3. A bidirectional amplifier comprising:

an amplifier having an input lead and an output lead;

first transistor means responsive to the application of a control voltage for controllably conducting a first input signal from a first terminal to said input lead;

second transistor means responsive to the application of a control voltage for controllably conducting a second input signal from a second terminal to said input lead;

third transistor means responsive to the application of a control voltage for controllably conducting an output signal of said amplifier from said output lead to said first terminal;

fourth transistor means responsive to the application of a control voltage for controllably conducting said output signal from said output lead to said second terminal;

means for selectively programming said first, second, third and fourth transistor means such that for a first program selection said first transistor means and said fourth transistor means conduct said first input signal and said output signal, respectively, and said second and said third transistor means block said second input signal and said output signal, respectively, and for a second program selection said second and third transistor means conduct said second input signal and said output signal, respectively, and said first and fourth transistor means block said first input signal and said output signal, respectively;

said means for selectively programming having a first lead connected to said first and fourth transistor means, and having a second lead connected to said second and third transistor means, so that said means for selectively programming generates said control voltage for controllably conducting said input and output signals;

wherein each of said first, second, third and fourth transistor means comprises a CMOS transmission gate, each of said CMOS transmission gates comprising an N-channel enhancement mode transistor a P-channel enhancement mode transistor and an inverter;

each transmission gate having an input lead, an output lead, and a control lead, said gate input lead connected to the drain electrodes of both said N-channel and said P-channel transistors, said gate output lead connected to the source electrodes of both said N-channel and said P-channel transistors, said control lead connected to the gate electrode of said N-channel transistor and the input of said inverter, and the output circuit of said inverter connected to the gate electrode of said P-channel transistor;

said first CMOS transmission gate having its control lead connected to said first programming lead and to said control lead of said fourth CMOS transmission gate and its output lead connected to said output lead of said second CMOS transmission gate and to said amplifier input lead and its input lead connected to said first terminal; and

said fourth CMOS transmission gate having its input lead connected to said amplifier output lead and its output lead connected to said second terminal; and

said second CMOS transmission gate having its control lead connected to said second programming lead and to said control lead of said third CMOS transmission gate and its input lead connected to said second terminal; and

said third CMOS transmission gate having its input lead connected to said amplifier output lead and its output lead connected to said first terminal.

4,695,741
SWITCHGEAR

Masatoshi Takeda, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 10, 1985, Ser. No. 732,720
Claims priority, application Japan, May 11, 1984, 59-92914; May 14, 1984, 59-94493
Int. Cl.[4] H03K *17/72*
U.S. Cl. 307—643 3 Claims

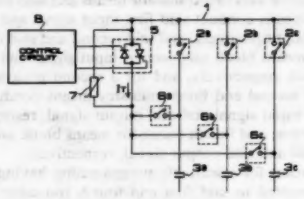
1. A switchgear comprising:

(a) a semiconductor switch connected to an a.c. power source and ON-OFF controlled in synchronism with the phase of said a.c. power source;

(b) a first switch connected in series with said semiconductor switch between the a.c. power source and the load, and arranged to close in advance of the turn-on operation of

said semiconductor switch when said load is to be connected to said a.c. power source and arranged to open after said load has been disconnected from said a.c. power source by the operation of said semiconductor switch when said load is to be disconnected from said a.c. power source; and

(c) a second switch connected in parallel to at least said semiconductor switch and arranged to close in advance of the turn-off operation of said semiconductor switch when said load is to be connected to said a.c. power source and arranged to open after said semiconductor switch has



turned on when said load is to be disconnected from said a.c. power source;

a nonlinear resistor element connected in parallel to said semiconductor switch;

means for controlling said semiconductor switch to turn on said semiconductor switch within one cycle of the closing of said first switch when power is to be supplied to said load and to turn off said semiconductor switch approximately one cycle before said first switch is opened when power is to be disconnected from the load whereby the time when voltage is applied to said nonlinear resistor is minimized.

4,695,742

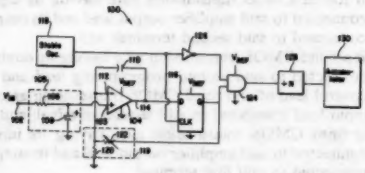
CHARGE BALANCE VOLTAGE-TO-FREQUENCY CONVERTER UTILIZING CMOS CIRCUITRY

Bruce E. Randall, Rock Hill, N.C., assignor to Sangamo Weston, Inc., Norcross, Ga.

Continuation of Ser. No. 492,533, May 9, 1983, abandoned. This application Jan. 20, 1987, Ser. No. 8,102

Int. Cl.[4] **H03L** *7/00;* **H03K** *5/00*

U.S. Cl. 307—271 **13 Claims**



1. A highly precise charge balance voltage-to-frequency converter requiring only a single polarity voltage power supply, comprising:

(a) integrator means, having a first input for receiving an input signal and a second input for receiving a feedback signal having a high state and a low state, for producing a first output signal as a function of the integral of the difference between the input signal and the feedback signal;

(b) reference oscillator means for generating a clock signal having first and second logic states;

(c) CMOS flip-flop means having a stable internal voltage threshold level derived from said voltage power supply and an input responsive to said first output signal and having a clock input responsive to said clock signal for producing said feedback signal at an output terminal of said flip-flop means when the magnitude of said first output signal and said voltage threshold level during an occurrence of said clock signal have a predetermined relationship;

(d) logic means, having a first input responsive to said clock signal and a second input responsive to said feedback signal, for producing an output pulse each time said clock signal and said feedback signal are in a common predetermined logic state;

(e) linear circuit means interconnecting said output terminal of said CMOS flip-flop means and said second input of said integrator means to form a continuous circuit path for said feedback signal; and

(f) accumulator means for accumulating a preselected proportion of the output pulses produced by said logic means, whereby the number of such output pulses so accumulated is indicative of a parameter of said input signal.

4,695,743

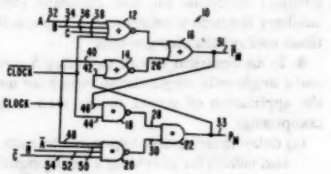
MULTIPLE INPUT DISSYMMETRIC LATCH

George S. Des Brisay, Jr., Hemet, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 23, 1985, Ser. No. 790,568

Int. Cl.[4] **H03K** *3/284, , 19/02, 3/26, 3/29*

U.S. Cl. 307—272.2 **7 Claims**



1. A method of providing first and second output signals, said first output signal being a logical complement of a corresponding second output signal, comprising the steps of:

receiving a first clock signal;

receiving a corresponding second clock signal, said second clock signal being a logical complement of said first clock signal;

receiving N first data signals, where N is an integer, and $N>1$;

receiving N second data signals, where each second data signal corresponds to a first data signal and is the logical complement of said first data signal;

the steps of receiving said first and second data signals both following the steps of receiving said first and said clock signals;

performing a first logical function characterized by an OR function of first and second logic inputs, said first logic input characterized by a NOR function of said second output signal and said second clock signal, said second logic input of said OR function characterized by a NOR function of said first data signals and said first clock signal; and

performing a second logical function characterized by an AND function of third and fourth logic inputs, said third logic input characterized by the NAND function of said first output signal and said first clock signal, said fourth logic input of said AND function characterized by the NAND function of said second data signals and said second clock signal;

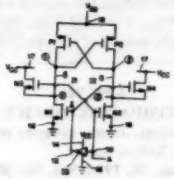
the steps of performing said first and second logical functions both following the steps of receiving said first and second data signals.

4,695,744

LEVEL SHIFT CIRCUIT INCLUDING SOURCE FOLLOWER OUTPUT

Raymond L. Giordano, Raritan Township, Hunterdon County, N.J., assignor to RCA Corporation, Somerville, N.J.

Filed Dec. 16, 1985, Ser. No. 809,132
Int. Cl.[4] H03K 3/26, 17/687; G01R 19/00
U.S. Cl. 307—279 9 Claims



1. The combination comprising:

first and second power terminals for the application therebetween of an operating potential;

first and second input terminals for the application thereto of complementary input signals;

first and second outputs at which are produced complementary output signals in response to said input signals;

first and second switching transistors, each having a conduction path and a control electrode;

means connecting the conduction paths of said first and second transistors between said first and second outputs, respectively, and said first power terminal;

means connecting the control electrodes of said first and second transistors to said first and second input terminals, respectively;

first and second variable impedance means connected between said first and second outputs, respectively, and said second power terminal;

third and fourth transistors of same conductivity type as said first and second switching transistors, said third and fourth transistors having source and drain electrodes defining the ends of a conduction path and a control electrode;

means connecting the source electrode of said third transistor to said first output and its control electrode to said second input terminal;

means connecting the source electrode of said fourth transistor to said second output and its control electrode to said first input terminal; and

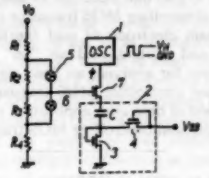
means connecting the drain electrodes of said third and fourth transistors to a point of operating potential for operating said third and fourth transistors in the source follower mode and for passing a current between said point of operating potential and said first output, in addition to, and of same polarity as, the current flowing through said first variable impedance means, when said third transistor is rendered conductive, and for passing a current between said point of operating potential and said second output, in addition to, and of same polarity as, the current through said second variable impedance means when said fourth transistor is rendered conductive.

4,695,745

MONOLITHIC SEMICONDUCTOR INTEGRATED CIRCUIT WITH PROGRAMMABLE ELEMENTS FOR MINIMIZING DEVIATION OF THRESHOLD VALUE

Toshio Mimoto, Nara, and Keizo Sakiyama, Kashihara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 14, 1984, Ser. No. 681,588
Claims priority, application Japan, Dec. 17, 1983, 58-238407
Int. Cl.[4] G05F 3/16
U.S. Cl. 307—297 4 Claims



1. A monolithic semiconductor integrated circuit comprising:

a substrate bias voltage generator circuit including,

an oscillator circuit and a charge pump circuit;

MOS transistor means connecting said oscillator circuit to said charge pump circuit; and

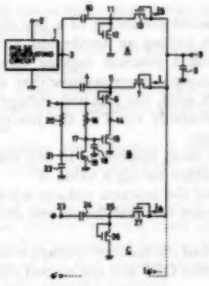
a plurality of programmable elements for permanently storing data being provided in a gate voltage circuit of said MOS transistor means to vary the voltage applied to the charge pump circuit in response to the memory content of said programmable elements.

4,695,746

SUBSTRATE POTENTIAL GENERATING CIRCUIT

Youichi Tobita, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1985, Ser. No. 763,588
Claims priority, application Japan, Oct. 19, 1984, 59-220906
Int. Cl.[4] H01L 27/10; H03L 1/00; H03K 3/354
U.S. Cl. 307—297 12 Claims



1. A substrate potential generating circuit for a semiconductor integrated circuit employing insulated-gate field-effect transistors as fundamental elements, in which said semiconductor integrated circuit comprises:

first circuit means receiving through a first capacitive element a pulse signal from a pulse generating circuit operated from a supply voltage for supplying a first substrate bias current to an output terminal at all times after application of said supply voltage; and

second circuit means receiving through a second capacitive element said pulse signal from said pulse generating circuit for supplying a second substrate bias current to said out-

put terminal for a predetermined period of time after application of said supply voltage;

said first circuit means comprises: a first rectifying MOS transistor connected between one electrode of said first capacitive element and said output terminal; and a second rectifying MOS transistor connected between said one electrode of said first capacitive element and ground, and

said second circuit means comprises: a third rectifying MOS transistor connected between one electrode of said second capacitive element and said output terminal; a fourth rectifying MOS transistor having one main electrode connected to said one electrode of said second capacitive element; a controlling MOS transistor connected between another main electrode of said fourth rectifying MOS transistor and ground; and an "on" signal generating circuit means for applying an "on" signal to a gate electrode of said controlling MOS transistor for a predetermined period of time after application of said supply voltage to render said controlling MOS transistor conductive.

4,695,747

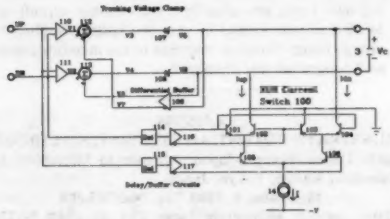
APPARATUS INCREASING DIODE SWITCHING SPEEDS

Paul W. Latham, II, Marlboro, Mass., assignor to Data General Corporation, Westborough, Mass.

Filed Jun. 26, 1985, Ser. No. 749,155

Int. Cl.[4] H03K *17/74*

U.S. Cl. 307—317 R **3 Claims**



1. Apparatus for increasing the switching speeds of a pair of diodes,

the pair of diodes consisting of a first diode and a second diode, each having an anode and a cathode, and each diode having a junction voltage being the voltage by which its anode is more positive than its cathode when it is in an ON state, the junction voltage of the first diode being substantially equal to the junction voltage of the second diode;

the apparatus being responsive to first and second voltages,

the first voltage having a value of

plus one-half the junction voltage when the first diode is to be turned ON and the second diode is to be turned OFF;

minus one-half the junction voltage when the first diode is to be turned OFF and the second diode is to be turned ON; or

zero volts when both the first and second diodes are to be turned OFF,

and the second voltage having a value of

plus one-half the junction voltage when the second diode is to be turned ON and the first diode is to be turned OFF;

minus one-half the junction voltage when the second diode is to be turned OFF and the first diode is to be turned ON; or

zero volts when both the first and second diodes are to be turned OFF,

the apparatus comprising

a differential buffer circuit having

a first input connected to the cathode of the first diode, the voltage at said cathode being a third voltage;

a second input connected to the cathode of the second diode, the voltage at said cathode being a fourth voltage;

a first output operatively derived from the first input being a fifth voltage which is greater than the third voltage by one-half the junction voltage; and

a second output operatively derived from the second input being a sixth voltage which is greater than the fourth voltage by one-half the junction voltage;

a first summer for adding the first voltage and the fifth voltage to produce a first sum, and for applying the first sum to the anode of the first diode; and

a second summer for adding the second voltage and the sixth voltage to produce a second sum, and for applying the second sum to the anode of the second diode.

4,695,748

COMPARING DEVICE

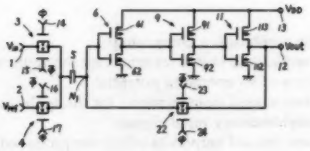
Toshio Kumamoto, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,442

Claims priority, application Japan, Aug. 27, 1985, 60-190737

Int. Cl.[4] H03K *5/24*

U.S. Cl. 307—355 **3 Claims**



1. A comparing device for obtaining binary outputs by comparing an input voltage and a reference voltage, comprising:

first switching means having an input terminal supplied with a voltage to be compared and an output terminal, and responsive to clock signals supplied from the exterior for turning on and off between said input terminal and said output terminal,

second switching means having an input terminal supplied with said reference voltage and an output terminal, and responsive to clock signals supplied from the exterior for turning on and off between said input terminal and said output terminal.

said first switching means and said second switching means being controlled so that they are turned on and off in a complementary manner,

a coupling capacitor having a first electrode and a second electrode, said first electrode of the coupling capacitor being connected to said output terminal of said first switching means and to said output terminal of said second switching means,

a first inverter having an input terminal and an output terminal, said input terminal of said first inverter being connected to the second electrode of said coupling capacitor, and said first inverter having a function of detecting a difference between the output voltage of said first switching means and the output voltage of said second switching means,

a second inverter having an input terminal and an output terminal, said input terminal of said second inverter being connected directly to the output terminal of said first inverter, and said second inverter having a function of amplifying the output of said first inverter,

a third inverter having an input terminal and an output terminal, said input terminal of said third inverter being connected to the output terminal of said second inverter,

and said third inverter having a function of amplifying the output of said second inverter, and

third switching means having an input terminal connected to the output terminal of said third inverter and an output terminal connected to the input terminal of said first inverter, and responsive to clock signals supplied form the exterior so as to be synchronized with the turning on and off of said second switching means for turning on and off between said input terminal and said output terminal of said third switching means.

4,695,749

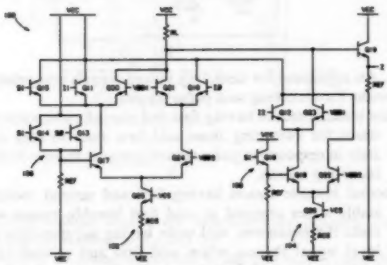
EMITTER-COUPLED LOGIC MULTIPLEXER

Nim C. Lam, Sunnyvale, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Feb. 25, 1986, Ser. No. 832,797

Int. Cl.⁴ H03K *19/086, 17/62*

U.S. Cl. 307—455 **5 Claims**



1. An ECL multiplexer comprising:

voltage means, including a high voltage source and a low voltage source, for supplying a potential differential between said high voltage source and said low voltage source, said voltage means further including reference voltage means for supplying constant voltage inputs:

current network means, including multiple paths, for providing multiple paths through which current can flow between said high voltage source and said low voltage source, said current network means being coupled to said voltage means output means, coupled to said current network means, for outputting a voltage as a function of which of said paths is carrying current;

said current network means including reference transistors, each reference transistor including an emitter, a collector and a base, the base of each said reference transistor being coupled to receive a constant voltage supplied by said reference voltage means, the collector and emitter of each reference transistor defining a reference electrical segment;

said current network means including data transistors for receiving plural data input signals, each data transistor including an emitter, a collector and a base, the base of each said data transistor being coupled to receive one of said data input signals, the collector and emitter of each reference transistor defining a data electrical segment, each said reference electrical segment and each data electrical segment constituting a segment of at least one of said paths so that current flows through such at least one path when and only when current flows through said segment,

each said data transistor being in emitter-coupled relation with a respective one of said reference transistors so that, when the voltage at the base of a given data transistor is greater than the constant voltage supplied to the base of the reference transistor emitter-coupled thereto, current is prohibited through said associated emitter-coupled reference transistor, and so that, when the voltage at the base of that data transistor is less than the constant voltage supplied to the base of the reference transistor emitter-coupled thereto, current is prohibited through said given data transistor; and

first and second non-empty sets of select transistors for receiving plural select signals, each select transistor including an emitter, a collector and a base, the base of each select transistor being coupled to receive one of said select signals, each select transistor of said first set being coupled to receive a first of said plural select signals at its base, each transistor coupled so that its base can receive said first select signal being included in said first set, each transistor of said second set being coupled to receive another of said select signals at its base,

said select transistors being operatively connected to said current network means so as to collectively prohibit current flow through all but at most one of said reference transistors having a data transistor emitter-coupled thereto, the set of reference transistors through which current is prohibited being a well-defined multi-variate function of the values of said select input signals whereby the multiplexer function is realized,

each transistor of said first set being in parallel with a transistor of said second set.

4,695,750

VOLTAGE LEVEL CONVERTING CIRCUIT

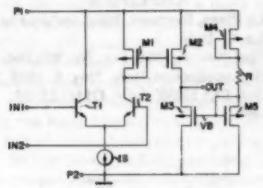
Hiroyuki Hara, Tokyo; Michinori Nakamura, and Yasuhiro Sugimoto, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Asaki, Japan

Filed Aug. 28, 1985, Ser. No. 770,090

Claims priority, application Japan, Aug. 29, 1984, 59-179644

Int. Cl.⁴ H03K *19/092, 19/086, 19/003, 17/10*

U.S. Cl. 307—475 **5 Claims**



1. A voltage level converting circuit for an input interface to a TTL circuit, comprising:

first and second potential terminals between which a power source voltage is applied;

first and second input terminals coupled for respectively receiving an input signal and an inverted input signal from an ECL circuit;

a differential amplifier for detecting a voltage difference between said input and said inverted input signals, including:

first and second bipolar transistors each having a base, collector, and emitter, with the bases respectively connected to the first and second input terminals, and with the collector of the first bipolar transistor connected only to the first potential terminal,

a first constant current source connected to the emitters of the first and second bipolar transistors and connected to the second potential terminal,

a first MOS transistor, with a source connected to the first potential terminal, and with the collector of the second bipolar transistor connected to a drain and a gate of the MOS transistor, for providing a current path from the first potential terminal to the collector of the second bipolar transistor at times when the second bipolar transistor is turned on,

wherein the first and second bipolar transistors are respectively turned on and off at times when the input signal is at a high voltage, and the first and second bipolar

transistors are respectively turned off and on at times when the input signal is at a low voltage; and

an output circuit for generating an output logic voltage in accordance with the detected voltage difference, including:

a second MOS transistor, with a source connected to the first potential terminal, with the collector of the second bipolar transistor connected only to a gate of the second MOS transistor and to the drain and gate of the first MOS transistor, and a drain,

a second constant current source connected to the drain of the second MOS transistor and to the second potential terminal, and

an output terminal at which the output logic voltage is generated connected to the drain of the second MOS transistor,

wherein a current path is provided from the first potential terminal to the output terminal and generates the output logic voltage at a high level at times when the second bipolar transistor is turned on, and a current path is not provided from the first potential terminal and generates the output logic voltage at a low level at times when the second bipolar transistor is turned off.

4,695,751

SAMPLING-DATA INTEGRATOR WITH COMMUTATED CAPACITANCE UTILIZING A UNITARY-GAIN AMPLIFIER

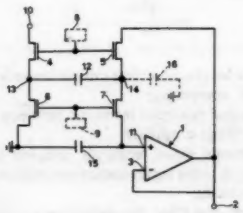
Alejandro De La Plaza, Bergamo, Italy, assignor to SGS Microelettronica S.p.A., Italy

Filed Nov. 4, 1986, Ser. No. 926,590

Claims priority, application Italy, Nov. 8, 1985, 22759 A/85

Int. Cl.[4] H03K *5/01*; G11C *27/02*

U.S. Cl. 307—490 **2 Claims**



1. Sampling-data integrator with commutated capacitances comprising a sampling capacitor, an integration capacitor, a unitary-gain amplifier and four switches commutatable between a low-resistance state and a high-resistance state, a first and a second switch being controlled by a first timing signal generator and a third and a fourth switch being controlled by a second timing signal generator synchronized with the first in such a manner that the related timing signals follow in sequence without overlapping, the first and the third switches being connected in series and the second and fourth switches being also connected in series, the sampling capacitor being connected between common circuit nodes placed between said switches in series and the integration capacitor being connected between an input of the amplifier and ground, characterized in that the series of the first and third switches is inserted between an input signal source and ground and the series of the second and fourth switches is inserted between the output of the amplifier and said input of said amplifier.

4,695,752

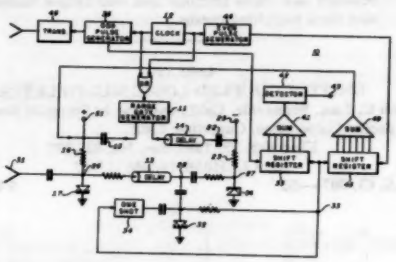
NARROW RANGE GATE BASEBAND RECEIVER

Gerald F. Ross, Lexington, and Kenneth W. Robbins, Wilmington, both of Mass., assignors to Sperry Corporation, New York, N.Y.

Filed Jan. 11, 1982, Ser. No. 345,310

Int. Cl.[4] G01R *29/02*; G01S *7/28*

U.S. Cl. 307—518 **9 Claims**



1. An apparatus for detecting pulsed signals comprising:

means for receiving said pulse signals;

first bistable means having first and second switchable stable states for switching from said first state to said second state in response to pulse signals coupled thereto from said receiving means;

second bistable means having first and second switchable stable states coupled to said first bistable means with a node therebetween, said node having substantially a low level signal thereat when said first and second bistable means are in said first state and a detectable level signal when a pulsed signal from said receiving means causes said first bistable means to switch to said second stable state;

third bistable means having first and second switchable stable states coupled to said node and responsive to said detectable level signal for switching from said first stable state to said second stable state, thereby generating an output pulsed signal;

generator means for providing first and second pulses of substantially equal duration and opposite polarity;

first means coupled between said generator means and said first bistable means for receiving and differentiating said first pulses; and

second means coupled between said generator means and said second bistable means for receiving and differentiating said second pulses.

4,695,753

CHARGE SENSOR HAVING A PRESET FLIPFLOP

Marcellinus J. M. Pelgrom, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 698,007, Feb. 4, 1985, abandoned. This application Sep. 18, 1986, Ser. No. 910,247

Claims priority, application Netherlands, Feb. 13, 1984, 8400453

Int. Cl.[4] H03K *3/45*

U.S. Cl. 307—530 **1 Claim**

1. A charge sensor, for use with a charge transfer device comprising:

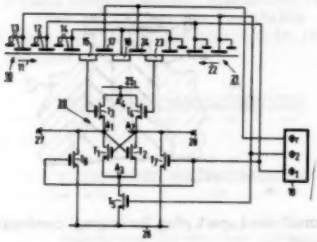
two cross-coupled MOS transistors T_1 and T_2 each having a source, a drain and a gate, the gate of T_2 and the drain of T_1 being connected to a first junction A_1 and the gate of T_1 and the drain of T_2 being connected to a second junction A_2, while the sources of T_1 and T_2 are connected to a third junction A_3;

two load MOS transistors T_3 and T_4 each having a source, a drain and a gate, the sources of T_3 and T_4 being directly and continuously connected to A_1 and A_2, respectively, and the drains of T_3 and T_4 being directly and continu-

ously connected to a fourth junction A_4, while the gates of T_3 and T_4 are coupled to a signal supply means;

a positive and negative current supply lead for passing a current between the junctions A_3 and A_4, junction A_4 being directly and continuously connected to one of said current supply leads, and a fifth MOS transistor T_5, which acts as a switch and has a gate which is connected to a clock voltage source which also timely applies the clock voltage for the intermittent energization of the sensor, a source and a drain;

a sixth (T_6) and a seventh (T_7) MOS transistor, each having a source, a drain and a gate, the drain of T_6 being connected to A_1 and the drain of T_7 being connected to A_2, while the sources of T_6 and T_7 are connected to the other of the current supply leads and the gates are connected to



a clock voltage source for intermittently opening and closing the transistors T_6 and T_7;

the drain of T_5 being connected to the junction A_3 and the source of T_5 being directly and continuously connected to the other supply lead associated with A_3 and the gates of T_5, T_6 and T_7 being connected to said clock voltage sources which supply clock voltage in a manner such that at the beginning of each cycle the junctions A_1 and A_2 are first set to a rest voltage by closing the transistors T_6 and T_7, after which, while T_5 is opened, T_6 and T_7 are also opened and the signal charges to be read are supplied directly to the gates of T_3 and T_4, as a result of which a signal-dependent voltage difference is obtained between the junctions A_1 and A_2, whereupon the transistors T_5 is closed and said voltage difference is increased.

4,695,754

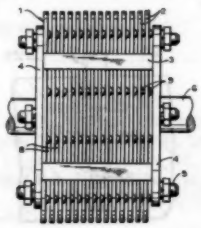
PERMANENT MAGNET ROTOR FOR AN ELECTRICAL MACHINE

Eatcho N. Popov; Krestyo A. Stanilov; Rumen K. Apostolov; Pantcho G. Dundarov, all of Sofia; Peyu V. Radkov; Pentcho K. Aderski, both of Troyan, and Georgi A. Georgiev, Sofia, all of Bulgaria, assignors to DSO "Elprom", Sofia, Bulgaria

Filed May 28, 1985, Ser. No. 738,594

Int. Cl.[4] H02K *1/22, 15/02*

U.S. Cl. 310—156 **1 Claim**



1. An inductor of a rotary electrical machine comprising a plurality of pole pieces, each pole piece representing a laminated pack of flux-conducting lamellae, and a plurality of permanent magnets, each magnet directly contacting a pole piece, gaps being provided between each of the flux-conducting lamellae: the pole pieces and the permanent magnets being covered by non-magnetic discs arranged parallel to said lamellae and clamped in a pack by studs, said non-magnetic disks being statically fixed to a shaft.

4,695,755

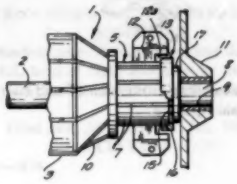
COLLAR FOR THE COMMUTATOR OF AN AUTOMOTIVE STARTER

Chester Brown, 133-20 91st Ave., Richmond Hill, N.Y. 11418

Filed Nov. 12, 1986, Ser. No. 929,612

Int. Cl.[4] H02K *13/10;* **H01R** *39/16*

U.S. Cl. 310—236 **4 Claims**



1. A collar adapted to be bonded to a commutator of an automotive starter motor for restraining thin copper bars extending longitudinally about the periphery of the commutator from peeling at their free ends and to provide lubrication between the collar and an end frame of the housing of the motor as the collar rotates with the commutator relative to the housing, wherein the collar comprises: a body of disc form provided with an axial hole whereby the collar may be passed over a stub shaft projecting axially from a rear end face of the commutator, the body having an inner flat face adapted to lie in abutment with the rear end face of the commutator, a rim about the body projecting forwardly beyond the inner flat face of the body, the rim being adapted to overlay the free ends of the bars, and a hub of reduced diameter projecting rearwardly from the body, the hub having radially extending cavities in its rear adapted to contain grease, the hub being adapted to serve as a thrust washer relative to the end frame of the housing, and the grease being adapted to serve as a lubricant for the collar as it rotates with the commutator relative to the end frame.

4,695,756

LAMINATED TERMINAL LAYER FOR ELECTRONIC COMPONENT

Yasuhiro Tanaka, Ishikawa, Japan, assignor to Murata Manufacturing Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 612,598, May 21, 1984, abandoned. This application Aug. 13, 1986, Ser. No. 895,580

Claims priority, application Japan, May 21, 1983, 58-77406[U]

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—355 **9 Claims**

1. A piezoelectric resonator, comprising:

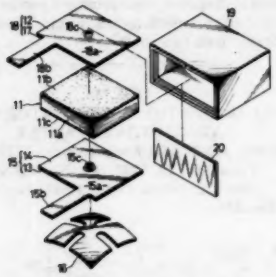
a housing having an opening for accommodating piezoelectric components, said components comprising:

a piezoelectric means having a flat piezoelectric member with electrodes formed on both sides thereof;

two terminal plates each interposed between an inner wall of said housing and one side of said piezoelectric means and being provided with a projection to contact a vibration node on each of said electrodes;

each of said terminal plates comprising a first layer of phosphor bronze and a second layer, for reducing vibration received by said piezoelectric means, having a thickness equal to 5% or more of the thickness of said first layer, of a member selected from the group consisting of Al, Ag, Pb or any alloy thereof laminated on said first layer in a

manner such that said second layer contacts each of said electrodes; and



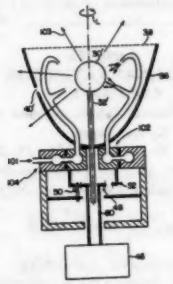
lead means extending from each of said two terminal plates through said opening.

4,695,757

METHOD AND APPARATUS FOR COOLING ELECTRODELESS LAMPS

Michael G. Ury, Bethesda, and Charles H. Wood, Rockville, both of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Continuation-in-part of Ser. No. 381,481, May 24, 1982, Pat. No. 4,485,332. This application Nov. 26, 1984, Ser. No. 674,631
Claims priority, application Japan, Dec. 5, 1983, 58-229730
The portion of the term of this patent subsequent to Nov. 27, 2001, has been disclaimed.
Int. Cl.[4] H01J 7/24, 61/52
U.S. Cl. 313—44 8 Claims



1. A method of cooling an electrodeless lamp having a lamp envelope which gets extremely hot during operation, comprising the steps of,

providing a source which produces at least a stream of cooling gas under pressure,

directing said at least a stream of cooling gas at said lamp envelope, and

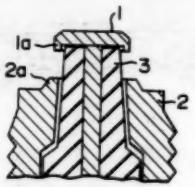
providing relative rotative motion between said lamp envelope and said source, wherein said relative rotative motion comprises rotating said source completely about said envelope.

4,695,758

SMALL-SIZED SPARK PLUG HAVING A SPARK GAP PARALLEL TO AN AXIS RUNNING THROUGH THE CENTER ELECTRODE

Minoru Nishida; Tadashi Hattori, both of Okazaki; Kunimasa Yoshimura, Mishima, and Tetsuzo Muraki, Hamamatsu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya; Toyota Jidosha Kabushiki Kaisha, Toyota and Nippon Soken, Inc., Nishio, all of, Japan

Filed Jul. 24, 1985, Ser. No. 758,415
Claims priority, application Japan, Jul. 25, 1984, 59-155046; Jul. 25, 1984, 59-155047
Int. Cl.[4] H01T 13/20
U.S. Cl. 313—130 12 Claims



1. A small-sized spark plug for internal combustion engines comprising:

a center electrode having a longitudinal axis extending through the center of the electrode and a shaft portion surrounded by an insulator layer and a terminal end portion adapted to act as a spark generation portion; and

an earthed electrode having a terminal end portion which is spaced in the direction of said axis apart from and is opposite to the terminal end portion of the center electrode so that the whole of a spark gap is defined along a surface of the insulator layer,

the shortest distance δ between each end portion of said two electrodes and the surface of said insulation layer and the distance l between said forward end portions of said two electrodes having the following relationship:

$$\delta \geqq 0.25\ l, \text{ and } 0.8\ \text{mm} \leqq l \leqq 2.0\ \text{mm},$$

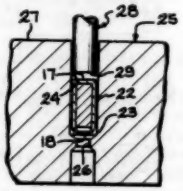
said plug reduces the deterioration in ignition efficiency caused by creeping discharge channelling phenomenon during operation of the plug.

4,695,759

METHOD FOR PRODUCING A COMPOSITE CENTER ELECTRODE AND AN ELECTRODE

Richard S. Podiak, Maumee, Ohio, assignor to Champion Spark Plug Company, Toledo, Ohio

Filed Oct. 29, 1981, Ser. No. 316,206
Int. Cl.[4] H01T 13/20
U.S. Cl. 313—136 9 Claims



7. A composite electrode for a spark plug comprising a core formed from a high thermally conductive metal, a wire terminal formed from a metal different from said thermally conduc-

tive metal having a predetermined diameter and an end abutting said conductive metal, said terminal having a diameter at said end smaller than said predetermined diameter and having a constricted diameter smaller than said end diameter adjecent said end, and a sheath formed from a corrosion-resistant metal surrounding and in contact with said thermally conductive metal, said terminal end and said constricted diameter portion of said terminal whereby said thermally conductive metal is completely enclosed.

4,695,760

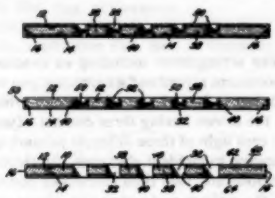
SELF-ALIGNED DOUBLE GRIDS FOR VACUUM TUBES

Thomas R. Anthony, Schenectady; Philip A. Lindner, Liverpool, both of N.Y., and Jewell G. Tucker, Owensboro, Ky., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 18, 1982, Ser. No. 339,955

Int. Cl.[4] H01J *1/46, 1/52, 17/04, 17/12, 19/38, 19/40, 21/10*

U.S. Cl. 313—348 **50 Claims**



1. A method for making

a composite structure providing first and second electrically conducting grid members with predetermined spacing therebetween comprising the steps of:

(a) providing a body of electrically non-conducting material having first and second opposed surfaces spaced apart to the extent of said predetermined spacing;

(b) employing a laser beam to cut a plurality of openings of pre-set shape, spacing and orientation through said body with the central axes of said openings being substantially parallel;

(c) covering the inside surfaces of said openings with a removable coating material, said first and second opposed surfaces being free of said coating material;

(d) bonding a first electrically conducting grid member having a first set of open areas therein to said first opposed surface and bonding a second electrically-conducting grid member having a second set of open areas therein to said second opposed surface, the periphery of each open area of said first set being permanently aligned with the periphery of an open area of said second set, each pair of aligned open areas being of substantially identical size and configuration and having the central axis of said pair substantially coincident with the central axis of one of said openings, and

(e) removing said coating material.

4,695,761

TENSION SHADOW MASK SUPPORT STRUCTURE

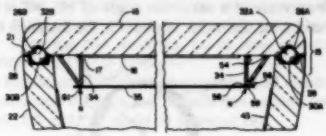
James R. Fendley, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Feb. 21, 1986, Ser. No. 832,556

Int. Cl.[4] H01J *29/07*

U.S. Cl. 313—407 **12 Claims**

1. A front assembly for a color cathode ray tube including a faceplate having on its inner surface a centrally disposed phosphor screen, said assembly including a shadow mask support structure composed of sheet metal secured directly to said inner surface and extending along opposed sides of said screen, and a foil shadow mask secured in tension on said structure, the



mechanical rigidity of said faceplate imparted to said support structure counteracting the tension in said mask.

4,695,762

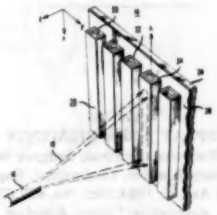
ELECTRON BEAM PUMPED ROD-LIKE LIGHT EMITTERS

George W. Berkstresser, Bridgewater, and Joseph Shmulovich, Murray Hill, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 28, 1985, Ser. No. 749,928

Int. Cl.[4] H01J *29/28*

U.S. Cl. 313—474 **18 Claims**



1. Optical apparatus comprising

means for generating a scannable electron beam, and

a luminescent screen including a transparent phosphor layer on which said electron beam is made incident to generate a scannable spot of light,

characterized in that

said phosphor layer comprises an array of elongated, rod-like elements each having at one end an output face from which said light emanates primarily in a direction parallel to the length of said elements,

a reflective coating covers other surfaces of each of said elements, and

said generating means provides said electron beam with an oblong cross section which is made incident along the length of selected ones of said elements.

4,695,763

REFLECTOR TYPE FLUORESCENT LAMP FOR OPTICAL APPARATUS

Toshitaka Ogasawara; Kazumasa Nohmi, both of Takatsuki; Masao Honmoh, Bizen, and Yukito Iseki, Takatsuki, all of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Oct. 17, 1985, Ser. No. 788,483

Claims priority, application Japan, Oct. 18, 1984, 59-220010

Int. Cl.[4] H01J *61/35, 61/44*

U.S. Cl. 313—487 **3 Claims**

1. A reflector type fluorescent lamp for optical apparatus comprising:

a glass tube,

a pair of electrodes sealed in said glass tube at respective ends thereof,

a specified amount of a rare gas and mercury,

a reflective layer formed on the inner wall of said glass tube in a configuration to have a main aperture at an angle of 50°–90° with respect to the axis of said glass tube and a sub-aperture at a narrower angle of 10°–40° with respect to said axis, said main aperture is for emission of light for

illumination of an object in an optical reading apparatus and said sub-aperture is for emission of light for erasing a drum of photosensitive material, and

a fluorescent layer formed on the reflective layer and on said sub-aperture.

4,695,764

DISPLAY ARRANGEMENTS

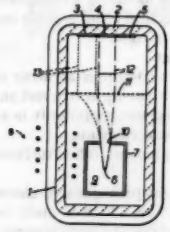
Ralph D. Nixon, Braintree, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed Aug. 2, 1984, Ser. No. 637,035

Claims priority, application United Kingdom, Aug. 5, 1983, 8321147

Int. Cl.⁴ H01J *1/62*

U.S. Cl. 313—497 **21 Claims**



1. A display arrangement including an evacuated envelope having a fluorescent screen and an electron gun which is capable of producing a flood beam of electrons which falls upon said screen, the screen having three distinct adjacent localized areas which emit light of three different primary colors respectively in response to incident electrons, the electron gun comprising a cathode and a field electrode positioned adjacent to the cathode and arranged to shape the flood beam which emerges from said gun, the three localized areas of the screen being such that the undeflected flood beam falls upon one of them; means for generating a predetermined magnetic field in the region of said gun, the angle at which said beam emerges from said gun being dependent upon the polarity of the magnetic field so that said beam is deflected to fall upon the other two localized areas respectively in response to a magnetic field of the same value but of opposite polarity.

4,695,765

DISPLAY ARRANGEMENTS

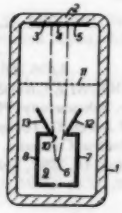
Ralph D. Nixon, Braintree, England, assignor to English Electric Valve Company Limited, Chelmsford, England

Filed Aug. 2, 1984, Ser. No. 637,036

Claims priority, application United Kingdom, Aug. 5, 1983, 8321146

Int. Cl.⁴ H01J *1/62*

U.S. Cl. 313—497 **20 Claims**



1. A display arrangement including an evacuated envelope having a fluorescent screen and an electron gun which is capable of producing a flood beam of electrons which falls upon said screen, the screen having three distinct adjacent localized areas which emit light of three different primary colors respectively in response to incident electrons, the electron gun comprising a cathode and two field electrodes positioned one on each side of the cathode and arranged to shape the flood beam which emerges from said gun, the three localized areas of the screen being such that the undeflected flood beam falls upon one of them, and such that the flood beam is deflected to fall upon the other two localized areas respectively in response to potentials of said field electrodes of the same value but of opposite effect.

4,695,766

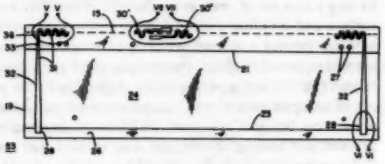
TRAVELING WAVE TUBE AND ITS METHOD OF CONSTRUCTION

John K. Waterman, Newton, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Aug. 1, 1986, Ser. No. 892,018

Int. Cl.⁴ H01J *25/34*

U.S. Cl. 315—3.5 **19 Claims**



1. A traveling wave tube comprising:

a first circuit block;

an electron beam tunnel having an axis of symmetry in said circuit block;

a folded waveguide slow-wave circuit in said first circuit block having an axis of symmetry, an input, and an output;

said folded waveguide axis being parallel to said beam tunnel axis;

an input transition section of waveguide;

an output transition section of waveguide;

an input waveguide;

an output waveguide;

said input transition section of waveguide connecting said input of said folded waveguide and said input waveguide;

said output transition section of waveguide connecting said

output of said folded waveguide and said output waveguide;

said folded waveguide, input and output transitions, and input and output waveguides each being in the form of a continuous slot in said first circuit block having two opposed walls;

said slot extending between first and second planar parallel opposed surfaces near one edge of said first circuit block; and

a first and second cover plate attached to said first and second planar opposed surface of said circuit block to provide another two opposed walls of said folded waveguide, said input and output transitions, and said input and output waveguides.

4,695,767

SINGLE-ENDED FLUORESCENT LAMP-BASE COMBINATION

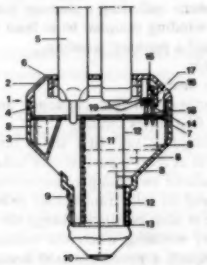
Horst Wittmann, Stadtbergen, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft für elektrische Glühlampen mbH, Munich, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,638

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1984, 3439171

Int. Cl.[4] H01J 7/44

U.S. Cl. 315—58 **8 Claims**



1. Single-ended low-pressure mercury vapor discharge lamp—and—base combination,

particularly compact fluorescent lamp, comprising at least one discharge vessel (5) formed by at least two parallel legs;

current leads (19) extending from said discharge vessel;

a hollow base body (1) having a first portion (2) for receiving the discharge vessel said legs of the discharge vessel (5) being secured to the receiving portion of the base body,

the base body further having an electrical connection,

an at least partly metallic screw-in terminal (9);

an accessory circuit (7, 8) secured to the base body, said accessory circuit having current leads (11, 12) extending therefrom, and including means (14, 16) for connection of the current leads (19) of the discharge vessel (5) to the accessory circuit;

wherein the electrical connection portion (3) of the base body (1) includes

an essentially cylindrical, internally hollow projecting wall portion (3a) extending to the vicinity of the bottom end of the screw-in terminal (9);

at least one (12) of the current connection leads (11, 12) extends through the hollow projecting wall portion (3a) around the hollow projecting wall portion and then adjacent the outer surface of said projecting wall portion (3a) of the base body (1),

the screw-in terminal (9) being secured over said essentially cylindrical projecting wall portion and pinching and clamping part of the at least one connection lead (12) between the screw-in terminal (9) and the outer surface of the essentially cylindrical wall portion of the base body; and

wherein the screw-in terminal (9) is secured to the outer surface of the essentially cylindrical wall portion (3a) of the base body (1) by punch deformation, while simultaneously clamping and pinching the at least one current connection lead (12) in position

to form a mechanically stable, immovable, and electrically tight connection between said at least one current connection lead (12) and the screw-in terminal (9).

4,695,768

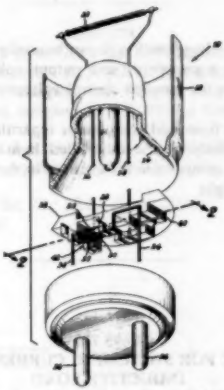
BIMETAL SWITCH FOR ELECTRODE HEAT CUTOUT WITHIN AN ELECTRICALLY INSULATING SUPPORT

Edward J. Covington, Highland Hts.; John E. Cridland, Cleveland Hts., and John P. Gorman, Mentor, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 19, 1985, Ser. No. 810,616

Int. Cl.[4] H01J 7/44, 17/34

U.S. Cl. 315—73 **28 Claims**



18. A fluorescent lamp electrode heat cutout device for use outside the lamp envelope which comprises a support of electrically insulating material supporting both a resistance wire heating element and a bimetal switch element disposed in predetermined heat exchange relationship with said heating element, whereby current is provided to one end of an electrode in said lamp through said bimetal switch element and whereby current is supplied to the other end of said electrode is said lamp through said heating element and wherein said heating element causes said bimetal switch element to break electrical contact with one end of said electrodes when said lamp has reached operating conditions.

4,695,769

LOGARITHMIC-TO-LINEAR PHOTOCONTROL APPARATUS FOR A LIGHTING SYSTEM

Karl Schweickardt, Cazenovia, N.Y., assignor to Wide-Lite International, San Marcos, Tex.

Filed Nov. 27, 1981, Ser. No. 325,378

Int. Cl.[4] H05B 37/02

U.S. Cl. 315—158 **6 Claims**

1. Photocontrol apparatus for logarithmically regulating the output of a controlled light to compensate for the logarithmic change in the intensity of a sensed external light being perceived as linear to the eye, the output of said controlled light being linearly dependent on the voltage applied thereto, comprising

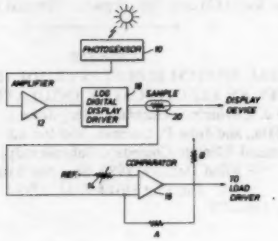
a comparator, the output voltage of which is connected to the controlled light, said comparator output being the

difference between an applied reference voltage and a sampled control voltage, and

means for producing said control voltage, including

photosensing means for sensing the external light and converting sensed light intensity therefrom to a voltage proportional thereto, and

logarithm-to-linear conversion means connected to said photosensing means for producing a linearly changing



output voltage with a logarithmically changing input voltage, a sample of said output voltage being connected as the sampled control voltage to said comparator,

the output from said comparator logarithmically varying the intensity of the controlled light to perceptually visually compensate for changes in the intensity of the sensed light.

4,695,770

CIRCUIT FOR SWITCHING CURRENT IN AN INDUCTIVE LOAD

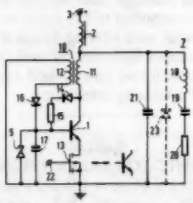
Hubert C. Raets, Nieuwenhagen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 7, 1985, Ser. No. 709,014

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1984, 3409423

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—207 **22 Claims**



1. A circuit arrangement for switching a current in a load which includes an inductive reactance, comprising, at least one transistor which switches through its collector-emitter path the current in the load, means connecting the transistor base to its emitter through a voltage-stabilizing element for stabilizing a voltage supplied to the base, said voltage-stabilizing element also being operative as a dissipation device for dissipating currents or voltages occurring in a sense opposite to the sense of conduction of the transistor and produced by th inductive reactance.

4,695,771

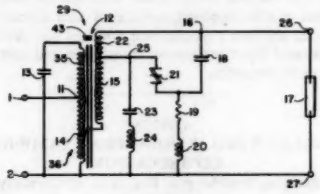
IGNITION CIRCUIT FOR HIGH PRESSURE ARC DISCHARGE LAMPS

Alexander R. Hallay, Chicago, Ill., assignor to Advance Transformer Company, Chicago, Ill.

Filed Jul. 29, 1985, Ser. No. 760,000

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—290 **27 Claims**



1. Apparatus for igniting and operating a high-pressure discharge lamp comprising:

a pair of input terminals for connection to a source of low frequency AC supply voltage,

a pair of output terminals for connection to the electrodes of the high-pressure discharge lamp,

inductance means including a step-up transformer having a secondary winding coupled to at least one of said output terminals and a primary winding,

a first capacitor,

an impedance means,

means connecting asid first capacitor and said impedance means in a first series circuit,

first means coupling said first series circuit to said input terminals via at least a part of said inductance means,

a voltage sensitive switching element coupled to said first capacitor and to said transformer primary winding and operable to at least partly discharge the first capacitor via said primary winding when the voltage across the first capacitor equals a predetermined breakdown voltage of the switching element, thereby to induce a high voltage ignition pulse in the transformer secondary winding,

and second means coupling a second capacitor to a winding of said transformer and to the other one of said output terminals, said second capacitor having a capacitance value such that the impedance of the second capacitor at the supply voltage frequency allows the second capacitor to develop a voltage that closely follows the AC supply voltage and, upon discharge of the first capacitor, the second capacitor maintains a high voltage level across said output terminals that closely approximates the level of the AC supply voltage at the time of discharge of the first capacitor.

4,695,772

DIGITAL MULTI-BEAM CRT CONTROLLER

Robert G. Lau, San Jose; Roy E. Murphy, Watsonville, and Robert G. Quick, Jr., Ben Lomond, all of Calif., assignors to Azuray Inc., Scotts Valley, Calif.

Filed Jul. 3, 1985, Ser. No. 752,266

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—370 **17 Claims**

1. A picture quality control system for use with a multi-beam raster scan display device having:

a cathode ray tube with multi-beam gun means for simultaneously generating a band of parallel electron beams, a screen, responsive to electrons impinging thereon, for displaying an image generated by said electron beams, and a neck coupling said gun means to said screen, said neck having a center axis and an acceleration region in which said beams are accelerated toward said screen; and

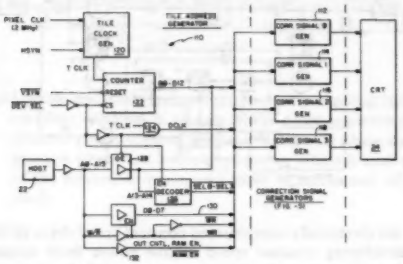
raster deflection means at the end of said neck for periodi-

cally deflecting said electron beams onto said screen in a predefined raster scan pattern;

said image comprising a multiplicity of parallel bands of pixels, each said band of pixels comprising a set of parallel lines of pixels generated by a separate sweep of said band of parallel electron beams across said screen;

said control system comprising:

linearity correction means, coupled to said raster deflection means, for adjusting the distance between neighboring ones of said bands of pixels in accordance with the position on said screen that said electron beams are being deflected to by said raster deflection means; and



dynamic detwist means for adjusting the relative positions of said electron beams within said band of electron beams, including

dynamic detwist coil means for generating an electromagnetic field, in a predefined portion of said neck of said cathode ray tube, which causes said band of beams to rotate with respect to the center axis of said neck; and

detwist correction signal generation means for controlling the magnitude of the electromagnetic field generated by said detwist coil means in accordance with the position on said screen that said electron beams are being deflected to by said raster deflection means.

4,695,773

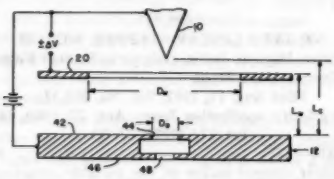
FIELD EMISSION GUN ELECTRODE GEOMETRY FOR IMPROVED FOCUS STABILITY

Lee H. Veneklasen, Castro Valley, and Guy G. Yagunoff, San Francisco, both of Calif., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 332,275, Dec. 18, 1981, abandoned, which is a continuation of Ser. No. 132,673, Mar. 21, 1980, abandoned. This application Apr. 16, 1984, Ser. No. 600,246

Int. Cl.[4] H01J *29/58, 29/52*

U.S. Cl. 315—382 **4 Claims**



1. A field emission gun having a coaxial triode electron beam forming structure including:

an electron emission source;

an accelerating anode having a first axial aperture therethrough, said first aperture having a diameter, D_ϕ, the spacing between said emission source and the proximate surface of said accelerating anode having the dimension, L_c; and

a Wehnelt electrode between said emission source and said accelerating anode, said Wehnelt having an axial aperture of a diameter, D_w, said Wehnelt being responsive to variable beam regulation signals for correspondingly varying the field strength of said emission source to produce a cathode lens effect, and also varying the emission from said source, said Wehnelt being parallel with and spaced from the proximate surface of said accelerating anode by a distance, L_w, and producing an electric field with an associated anode lens effect;

the dimensions for said D_ϕ, L_c, D_w and L_w being selected in relationship to each other to provide focus stability to said field emission gun irrespective of variations in said beam regulation signals, by the placement of said Wehnelt electrode such that electric potential changes on said Wehnelt electrode produce a precise balance of each of said lens associated with said cathode emission source and said anode so that no axial shift in position of the image of said emission source results.

4,695,774

LINE OUTPUT CIRCUIT FOR GENERATING A LINE FREQUENCY SAWTOOTH CURRENT

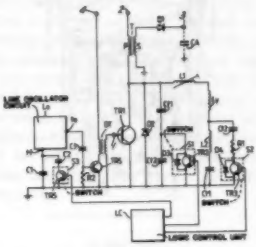
Derek J. Gent, Wallington, and Michael Bergström, Sutton, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 11, 1986, Ser. No. 873,229

Claims priority, application United Kingdom, Jun. 19, 1985, 8515483

Int. Cl.[4] H01J *29/70, 29/76*

U.S. Cl. 315—408 **13 Claims**



1. A line output circuit for generating a sawtooth deflection current having a scan period and a flyback period selectively at a first or a second line frequency through a line deflection coil for deflecting an electron beam in a cathode ray display tube where said second frequency is higher than said first frequency, said circuit comprising the series arrangement of a line deflection coil and first or second trace capacitance selected by first switch means which series arrangement is connected across the terminals of a controlled switch, flyback capacitance also being connected across th terminals of said controlled switch, one terminal of the controlled switch being additionally connected to the primary winding of a transformer which winding is additionally arranged to receive a voltage supply from a source of direct voltage, said transformer having a secondary winding one end of which is connected to a rectifier for generating, during the flyback period, the EHT supply for the final anode of a display tube, said controlled switch being conducting during the scan period and being rendered nonconducting at the end of the scan period under the control of line pulses at said first or second frequency applied to a control input of said controlled switch to initiate the flyback period, characterised in that said first switch means additionally causes an inductor to be included in the series arrangement of the deflection coil and the appropriate trace capacitance when said circuit is set for operation at the first line frequency for main-

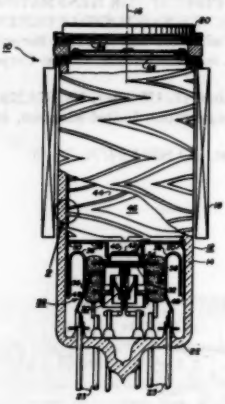
taining substantially the same scan current through said deflection coil as when set for said second line frequency with the same value for the direct supply voltage, said circuit further comprising second switch means for selecting flyback capacitance of a higher value when set for operation at said first line frequency than when set for operation at the second line frequency for maintaining substantiallyt he same ratio between the flyback and line periods at both line frequencies, the value of the EHT supply generated by said circuit being substantially the same when the circuit operates at either the first or the second line frequency.

4,695,775

IMAGING SYSTEM HAVING AN IMPROVED ELECTROSTATIC YOKE AND METHOD OF MAKING SAME

Ira G. Ritzman, Paradise Township, Lancaster County, and Joseph W. Wright, Lancaster, both of Pa., assignors to RCA Corporation, Princeton, N.J.

Filed May 15, 1986, Ser. No. 863,430
Int. Cl.⁴ H01J *29/74, 29/46*
U.S. Cl. 315—410 **11 Claims**



1. In an imaging system for focusing and deflecting an electron beam comprising:

an evacuated envelope structure having a longitudinal axis;

magnetic field means for generating a substantially uniform magnetic field within the envelope and along said axis thereof;

an electrostatic yoke within said envelope for generating a variable substantially uniform electric field within said envelope to deflect said electon beam along two coordinates of said system, said electric field being orthogonal to said magnetic field;

an electron gun disposed within said envelope for generating and directing said electron beam through said magnetic and electric fields; and

a target located within said envelope opposite said electron gun, said target being disposed in a plane perpendicular to said longitudinal axis, the improvement wherein

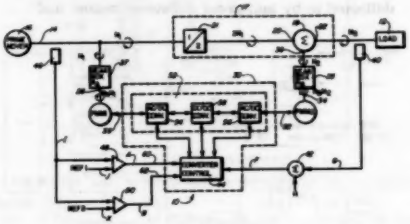
said electrostatic yoke comprising a first conductive layer bonded to said interior surface of said envelope and a second conductive layer overlying said first conductive layer and being in contact therewith, said first layer having a thickness in the range of about 500 to 1000 Å and said second layer having a thickness in the range of about 800 to 1500 Å, said first and second layers including two pairs of interleaved electrodes.

4,695,776

POWER CONVERTER FOR AN ELECTRICALLY-COMPENSATED CONSTANT SPEED DRIVE

Bryan W. Dishner, Roscoe, Ill.; Richard D. Juarros, Los Lunas, N. Mex., and P. John Dhyanchand, Rockford, Ill., assignors to Sunstrand Corporation, Rockford, Ill.

Continuation-in-part of Ser. No. 812,396, Dec. 23, 1985, abandoned. This application Aug. 6, 1986, Ser. No. 893,943
Int. Cl.⁴ F01D *15/10;* **H02P** *9/00*
U.S. Cl. 318—14 **31 Claims**



1. An electrically-compensated constant speed drive (CSD) for developing constant speed motive power from variable speed motive power developed at an output shaft of a prime mover, comprising:

a speed summer having first and second input shafts and an output shaft at which the constant speed motive power is developed, the first input shaft being coupled to the prime mover output shaft;

a speed-compensating permanent magnet machine having a motive power shaft coupled to the second input shaft of the speed summer and electrical power windings;

a control permanent magnet machine having a motive power shaft coupled to either of the first and output shafts of the speed summer and also having electrical power windings;

a first bi-directional AC/DC converter coupled to the electrical power windings of one of the permanent magnet machines;

a second bi-directional AC/DC converter coupled to the electrical power windings of the other of the permanent magnet machines;

a bi-directional DC/DC converter coupled between the AC/DC converters; and

means for controlling the AC/DC converters and the DC/DC converter whereby electrical power is transferred between the permanent machines so that the speed-compensating permanent magnet machine develops compensating speed of a magnitude and direction sufficient to maintain the speed summer output shaft at the desired speed.

4,695,777

VR TYPE LINEAR STEPPER MOTOR

Masuo Asano, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Aug. 17, 1981, Ser. No. 293,311
Claims priority, application Japan, Aug. 27, 1980, 55-118193
Int. Cl.⁴ H02K *41/00*
U.S. Cl. 318—135 **3 Claims**

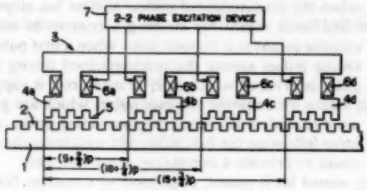
1. A linear stepper motor of the variable reluctance type comprising:

a stator having a plurality of stator teeth formed with an equal pitch p along a longitudinal direction;

a slider having four slider poles consisting of A pole, B pole, C pole, and D pole arranged in a longitudinal direction in that order, each of said slider poles being provided with a plurality of slider teeth formed oppositely to, and with identical pitch with, said stator teeth;

distances separating said B pole, C pole and D pole from said A pole being respectively (L+2/4)p, (M+1/4)p and (N+3/4)p wherein L, M and N are natural numbers;

four windings, wound about and cooperating with said four slider poles independently to form A phase, B phase, C phase and D phase, respectively; and



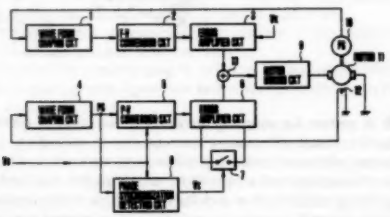
2-2 phase excitation means for repeatedly exciting two of said four windings in at least one of a first sequence of A phase-C phase, C phase-B phase, B phase-D phase and D phase-A phase, and a second sequence which is a reversal of the former, to move said slider in increments of 1/4 pitch.

4,695,778

ROTATION PHASE CONTROL DEVICE

Yasuo Chito, Saitama, and Masahiko Ogawa, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 22, 1985, Ser. No. 693,501
Claims priority, application Japan, Jan. 26, 1984, 59-13156
Int. Cl.[4] H02P 5/50
U.S. Cl. 318—314 **5 Claims**



1. A rotation phase control device for a motor having a rotor, comprising:

(a) phase detection means for detecting the rotation phase of said rotor to produce a phase detection signal;

(b) error detection means for producing a phase error signal which has a voltage corresponding to a phase difference between said phase detection signal and a predetermined reference signal;

(c) discrimination means or periodically discriminating whether the phase difference between said phase detection signal and said reference signal is within a predetermined different to produce a discrimination signal;

(d) amplifying means for amplifying said phase error signal;

(e) rotation phase control means for controlling the rotation of said rotor based on said phase error signal amplified by said means; and

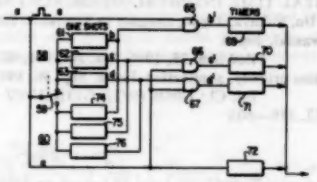
(f) frequency characteristic changing means for changing the frequency characteristic of said amplifying means in response to said discrimination signal.

4,695,779

MOTOR PROTECTION SYSTEM AND PROCESS

Kenneth H. Yates, Midland, Tex., assignor to Sargent Oil Well Equipment Company of Dover Resources, Incorporated, Tulsa, Okla.

Filed May 19, 1986, Ser. No. 864,717
Int. Cl.[4] H02P 1/04
U.S. Cl. 318—484 **25 Claims**



1. In a protection system for a motor designed to run under conditions of varying speed and having a plurality of operating modes as determined by the connections of the leads of the windings of said motor, the combination comprising:

a. means for generating a motor speed signal representative of the speed of said motor;

b. means establishing at least two stall condition suites corresponding respectively to at least two of said motor modes and each having at least two stall speed set points, the first of said set points corresponding to an upper stall speed and the second of said stall points corresponding to a lower stall speed;

c. means for monitoring at least some of the connections of said motor winding leads to determine the existing operational motor mode and selecting the stall condition suite corresponding to the existing motor mode; and

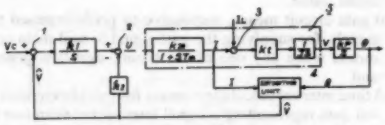
d. means for comparing said motor speed signal with the selected stall speed suite and in response to said motor speed signal having a value corresponding to said upper stall speed set point for a predetermined time period or having a second lower value corresponding to said second stall speed set point for a second time period which is shorter than said first time period generating a motor control function.

4,695,780

SERVOMOTOR VELOCITY CONTROL SYSTEM

Mitsuo Kurakake, Hino; Keiji Sakamoto, and Yukio Toyosawa, both of Hachioji, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP85/00620, § 371 Date Jul. 2, 1986, § 102(e) Date Jul. 2, 1986, PCT Pub. No. WO86/03074, PCT Pub. Date May 22, 1986
PCT Filed Nov. 7, 1985, Ser. No. 885,577
Claims priority, application Japan, Nov. 9, 1985, 60-236475
Int. Cl.[4] G05B 13/00
U.S. Cl. 318—561 **3 Claims**



1. A servometer velocity control system in which a position signal from a rotary encoder mounted on a servomotor driving a mechanical load is fed back and a torque command signal is produced for application to the servomotor, the system comprising:

an estimating unit for obtaining an estimated value of veloc-

ity of the servomotor based on the position signal from the rotary encoder, motor current of the servomotor and a load torque signal, and

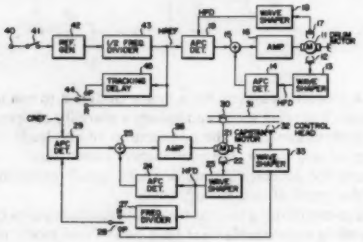
arithmetic means for calculating the torque command signal based on the estimated value of velocity outputted by said estimating unit and a velocity command signal.

4,695,781

DIGITAL TIME INTERVAL MEASURING APPARATUS

Kenji Ito, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 25, 1986, Ser. No. 911,382
Claims priority, application Japan, Sep. 30, 1985, 60-216554
Int. Cl.[4] G05B *19/21;* G11B *21/02*
U.S. Cl. 318—603 **23 Claims**



1. A digital time interval measuring apparatus comprising:

(a) main counter means, responsive to a predetermined clock signal and a gate signal, for stopping the counting of the clock signal when the gate signal is supplied, and for counting the clock signal when the gate signal is not supplied, thereby providing a main count value;

(b) gate circuit means, responsive to predetermined timing signals, for supplying the gate signal to said main counter means when any one of the timing signals is generated;

(c) count value storage means, coupled to said main counter means and said gate circuit means, for storing main count data representing the main count value obtained when said main counter means stops the counting of the clock signal in response to the gate signal;

(d) compensation means, coupled to said gate circuit means, for providing compensation data corresponding to the number of the gate signals generated; and

(e) time interval detection means for detecting time interval data, representing a signal time interval between one and another one of the predetermined timing signals, based on a difference between the main count value from said main counter means and the main count data from said count value storing means, and based on the compensation data from said compensation means.

17. A digital time interval measuring apparatus comprising:

(a) main counter means, responsive to a predetermined clock signal and a gate signal, for counting the clock signal when the gate signal does not exist, and outputting a main count value;

(b) gate circuit means, responsive to predetermined timing signals, for supplying the gate signal to said main counter means when any one of the timing signals is generated; and

(c) time interval calculation means for calculating time interval data representing a signal interval between one of the predetermined timing signals and another one thereof, based on the main count value obtained when said main counter means stops the counting of the clock signal in response to generation of the gate signal, and based on count stop data corresponding to a count stop period and the number of count stop operations of said main counter means.

18. A digital time interval measuring apparatus comprising:

(a) cyclic counter means for counting a predetermined clock signal;

(b) circuit means for generating a gate pulse to stop the counting of said cyclic counter means for a predetermined period of time, every time a predetermined timing pulse is supplied, and for stopping the generation of the gate pulse to allow said cyclic counter means to resume the counting when the predetermined period of time has elapsed;

(c) first latch means for latching a content of said cyclic counter means in a stopped state, when a first pulse of two timing pulses among the predetermined timing pulses, a pulse interval of which is to be measured, is supplied;

(d) means for counting the gate pulses which are generated upon reception of, among the two timing pulses, a second pulse following the first pulse, and weighting the obtained count to provide a correction value NX; and

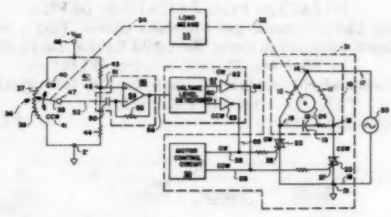
(e) second latch means, responsive to a content NA of said cyclic counter means, a content NB of said first latch means, and the correction value NX, for performing an arithmetic operation of NA−NB+NX, and latching the result of this arithmetic operation when the second pulse is supplied.

4,695,782

SYSTEM FOR INSURING ROTATIONAL DIRECTION FOR AN ALTERNATING CURRENT MOTOR

Girts U. Jatnieks, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 8, 1986, Ser. No. 904,995
Int. Cl.[4] H02P *3/20, 1/40*
U.S. Cl. 318—748 **8 Claims**

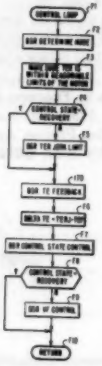


1. A system for insuring the correct direction of rotation of a bi-directional, alternating current motor, including: permanent magnet rotor means for said motor; stator means having a pair of windings and a capacitor; said capacitor and said windings being connected in a delta connection configuration and having external connection means; motor control means connected to said connection means and to a source of alternating current potential to energize said motor to cause said rotor means to rotate in either a clockwise direction or a counter-clockwise direction in response to said motor control means; said motor having rotational output means to drive load means; bridge means including sensor means driven with said load means and providing a time varying voltage signal from said bridge means; said sensor means limited in movement to correspond to the movement of said load means; differentiator means having an input means and an output means with said input means connected to said sensor means to differentiate said time varying voltage signal; said output means of said differentiator means providing a resultant signal; voltage level detector means having input means connected to receive said resultant signal; said voltage level detector means having two output signals in response to operation of said sensor means; and said voltage level detector means connected to said motor control means to insure that said rotor means rotates in only the direction that said control means dictates by said two output signals from said differentiator means selectively acting with said motor control means.

4,695,783
INDUCTION MOTOR CONTROL APPARATUS AND METHOD

David J. Shero, South Park Twp., Allegheny County, Pa., and Habib Dadpey, Atlanta, Ga., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 22, 1985, Ser. No. 790,009
Int. Cl.[4] H02P 5/41
U.S. Cl. 318—808 11 Claims



1. In control apparatus for a load having at least one phase and operative with an inverter including a first switch device and a second switch device for each phase of the load, said inverter being coupled with a power source and responsive to an effort request signal, the combination of

first means for determining in response to said effort request signal and in relation to each motor phase the successive first conduction times for the first switch device and the successive second conduction times for the second switch device to supply a desired output voltage having a desired frequency for energizing said phase of said load,

second means for determining the current angle between said voltage and the load current,

third means for determining in relation to said angle when the output current is positive and when the output current is negative, and

fourth means for providing a first modification to one of the first and second conduction times in response to said positive current and providing a second modification to the other of said first and second conduction times in response to said negative current, with said first and second modifications being removed in response to said desired output voltage.

4,695,784
VOLTAGE AND CURRENT LIMITING PHASE-TRIGGERED BATTERY CHARGER WITH CONTINUOUS OPTIMIZATION OF CHARGING RATE

William R. Reynolds, 63 Myrtle Ave., Madison, N.J. 07490

Continuation of Ser. No. 728,819, Apr. 30, 1985, abandoned.
This application Sep. 4, 1986, Ser. No. 904,785
Int. Cl.[4] H02J 7/04
U.S. Cl. 320—32 5 Claims

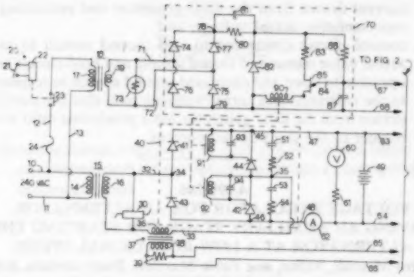
1. In a battery charging circuit for providing a battery with a charging current not greater than a predetermined current limit and a charging voltage not greater than a predetermined voltage limit, the improvement comprising:

means for sensing the amount of charging current provided to the battery by the charging circuit, said charging current sensing means generating a first signal indicative of the amount of charging current;

a first adjustable zener diode operating in its linear region as an amplifier, and having an anode, a cathode, and a reference terminal, said first signal being applied to said reference terminal of said first adjustable zener diode wherein the amount of current flow through said first adjustable zener diode from cathode to anode is generally proportional to the amount of charging current;

means for sensing the amount of charging voltage provided across the battery by the charging circuit, said charging voltage sensing means generating a second signal indicative of the level of charging voltage;

a second adjustable zener diode operating in its linear region as an amplifier and having an anode, a cathode, and a reference terminal, said second signal being applied to said



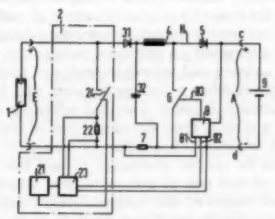
reference terminal of said second adjustable zener diode wherein the amount of current flow through said second adjustable zener diode from cathode to anode is generally proportional to the amount of charging voltage; and

means responsive to said current flow through said first adjustable zener diode and to said current flow through said second adjustable zener diode, said responsive means regulating the charging current and charging voltage so that the charging current is provided to the battery at a level not greater than said predetermined current limit and the charging voltage is provided across the battery at a level not greater than said predetermined voltage limit, whereby the charging rate is continuously optimized.

4,695,785
CIRCUIT ARRANGEMENT FOR FEEDING AN ELECTRICAL LOAD FROM A SOLAR GENERATOR

Guenther Mieth, Munich, and Ulf Schwarz, Pullach, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,452
Claims priority, application Fed. Rep. of Germany, Jun. 20, 1985, 3522080
Int. Cl.[4] G05F 1/565
U.S. Cl. 323—222 5 Claims



1. A circuit arrangement for feeding a load from a solar generator comprising:

an input for connection to the solar generator and an output for connection to the load;

a reference voltage generator including a first switch and a precision resistor connected across said input, and a clock connected to said first switch and operable to generate clock pulses to periodically close said first switch so that reference voltage pulses are produced across said first precision resistor representing the short-circuit current of the solar generator;

a sample and hold circuit connected to said first precision resistor and connected to and operated by said clock for sampling the reference voltage pulses;

a second switch connected across the output of said arrangement;

actual value means connected to said input for measuring the current drawn from the solar generator and producing a representative actual voltage; and

a control circuit connected to said second switch to said actual value means and to said sample and hold circuit and operable to open and close said second switch in response to the reference and actual voltages such that the current drawn from the solar generator has a prescribed ratio with respect to the short-circuit current.

4,695,786

VOLTAGE REGULATOR FOR AN ALTERNATOR HAVING AN AUXILIARY STAGE FOR STARTING THE ALTERNATOR AT A LOW ROTATIONAL SPEED

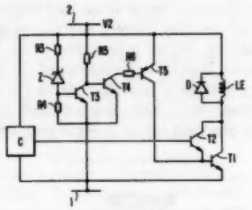
Pietro Menniti, Milan, and Fabio Marchio, Busto Arsizio, both of Italy, assignors to SGS Microelettronica SpA, Agrate Brianza, Italy

Filed May 20, 1986, Ser. No. 865,026

Claims priority, application Italy, May 20, 1985, 20797 A/85

Int. Cl.[4] G05F *5/00;* **H02P** *9/10*

U.S. Cl. 323—303 **1 Claim**



1. In a voltage regulator for an alternator having first and second supply terminals and comprising a control stage connected between said first and second supply terminals and having an output terminal connected to a base of a first transistor of a pair of transistors forming part of an actuator stage of said regulator, said pair of transistors being connected together in a Darlington configuration and having their collectors connected to an exciter winding of said alternator, the improvement comprising an auxiliary stage connected between said first and second supply terminals, and having an output terminal connected to the base of a second transistor of said pair of transistors of said actuator stage and comprising a determining circuit means for determining a reference voltage and control circuit means for causing said second transistor of said pair of transistors to conduct when a voltage between said first and second supply terminals is lower than said reference voltage, thereby reducing a voltage drop across said pair of transistors; wherein said first transistor of said pair of transistors of said actuator stage has its emitter connected to said base of the second transistor of said pair of transistors, and wherein said determining circuit means of said auxiliary stage comprises at leat one resistor and at least one Zener diode disposed in series and connected between said first supply terminal and a base of a third transistor forming part of said auxiliary stage and at least one resistor connected between said base of said third transistor and said second supply terminal, and wherein said control circuit means of said auxiliary stage comprises a fourth transistor having its base connected to said first supply terminal and to a collector of said third transistor and having its emitter and collector respectively connected between said second supply terminal and a base of a fifth transistor which is connected between said first supply terminal and an output terminal of said auxiliary stage.

4,695,787

DEVICE FOR DETECTING AND LOCATING PENETRATION OF WATER INTO A MARINE ACOUSTIC STREAMER

Daniel Billet, St. Paul De Vence, and Jean F. Cesarini, Nice, both of France, assignors to Thomson CSF, Paris, France

Filed Aug. 27, 1985, Ser. No. 769,735

Claims priority, application France, Aug. 31, 1984, 84 13510

Int. Cl.[4] G01V *1/38;* **G01R** *31/02*

U.S. Cl. 324—557 **6 Claims**

1. A marine acoustic streamer assembly for passively detecting submarine noises comprising:

a plurality of hollow streamer elements connected to each other by sealed junctions and filled with a non-conducting oil;

a plurality of humidity sensors disposed in said streamer elements proximate said junctions;

means for monitoring said humidity sensors to determine if any of said sealed junctions has water leaking therein and for determining the location of such leakage if it exists by means of brief pulse reflectometry.

4,695,788

OPEN FAULT LOCATION SYSTEM FOR PHOTOVOLTAIC MODULE STRINGS

Neil A. Marshall, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 11, 1984, Ser. No. 680,451

Int. Cl.[4] G01R *31/08;* **H01L** *31/00*

U.S. Cl. 324—527 **26 Claims**

1. Apparatus for detecting the location of open faults in a series-connected string of photovoltaic (PV) modules, comprising means for impressing rf test signals onto said module string at a predetermined location in the series-connected string, the frequency of said rf signals being selected in dependence on the reactive loss of said PV module string to be low enough that the string does not become an rf radiator, means for detecting the presence or absence of such rf signals, and probe means for coupling rf signals from successive positions adjacent said modules to said means for detecting such signals, said means for detecting the presence or absence of such rf signals further comprising means responsive to the absence of such detected signals for indicating the location of an open fault in the PV module string, the presence of such detected test signals indicating that continuity exists in the PV module string between said predetermined location and the position

where said probe is disposed, and the absence of such detected signals indicating that the PV module string is open faulted between said probe and said predetermined location.

4,695,789

PROBE DEVICES

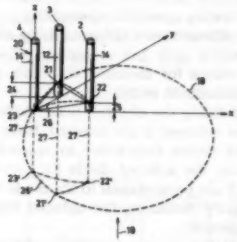
Johannes Lambertz, Kerpen, and Ingo Schumacher, Cologne, both of Fed. Rep. of Germany, assignors to Rheinische Braunkohlenwerke AG., Fed. Rep. of Germany

Filed Jul. 16, 1985, Ser. No. 755,405

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1984, 3426993

Int. Cl.⁴ G01F *23/28*

U.S. Cl. 324—61 P **8 Claims**



1. A probe device including a holder, a first capacitive measuring sensor carried by the holder and comprising a first hollow electrical conductor, and second and third mutually separate electrical conductors which are disposed in at least substantially parallel and approximately coaxial relationship within the first conductor and which have tips terminating outside the first conductor at an axial spacing from each other in a common ceramic casing adapted for detecting the presence and the speed of propagation of a first medium in a system comprising a plurality of media with different dielectric constants which in certain states form phases having interfaces with each other, and second and third further capacitive measuring sensors each having a respective single coaxial inner conductor, the sensors being so arranged in the holder that the three tips thereof lie in a common plane and are disposed in a triangular configuration.

4,695,790

RF FREQUENCY SPECTRUM ANALYZER SUBSYSTEM

Ronald F. Mathis, San Diego, Calif., assignor to General Dynamics Electronics Division, San Diego, Calif.

Filed Jan. 2, 1986, Ser. No. 815,630

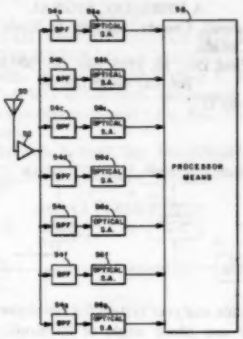
Int. Cl.⁴ G01R *23/16*

U.S. Cl. 324—77 K **12 Claims**

1. A spectrum analyzer subsystem for analyzing the frequency content of an RF signal, comprising:

optical source means responsive to an RF signal for generating a plurality of intensity modulated optical signals;

filter means responsive to each one of said intensity modulated optical signals for providing a plurality of output optical signals each corresponding to a respective one of said intensity modulated optical signals, each output optical signal corresponding in intensity to the frequency content of an RF signal within a different predetermined frequency bandwidth; and



detector means responsive to each output optical signal for converting each output optical signal into a corresponding electrical signal.

4,695,791

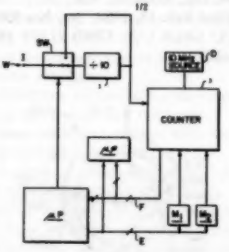
AUTO RANGING OF A FREQUENCY MEASURING INSTRUMENT

Robert V. Miller, Dover, N.J., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 4, 1985, Ser. No. 740,947

Int. Cl.⁴ G01R *23/10*

U.S. Cl. 324—78 D **6 Claims**



6. Apparatus for selecting the best mode in which to make a frequency measurement comprising:

an input gate to which a signal whose frequency is to be measured may be applied,

means for opening the gate for a trial interval,

means for counting the number of cycles of the signal that pass through the gate during the trial interval and indicating said number by a series of digits,

means for examining groups of said digits in said number to determine the range in which the frequency of the wave lies,

means responsive to the range determined by said examining means for indicating whether the frequency mode should be used or whether the period mode should be used, and

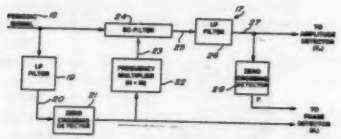
means for deriving the frequency of the signal in accordance with the indicated mode.

4,695,792

METHOD AND SYSTEM FOR MEASURING THE AMPLITUDE AND PHASE ANGLE OF HARMONICS IN A PERIODIC SIGNAL

Gilles Roy, Beloeil, Canada, assignor to Ecole Polytechnique, Montreal, Canada

Filed Dec. 16, 1985, Ser. No. 809,046
Int. Cl.[4] G01R *25/00*
U.S. Cl. 324—83 D **16 Claims**



1. A harmonics analyzer system for simultaneously detecting the amplitude and phase angle of harmonics in a periodic signal, said system comprising: a tunable tracking filter connected to an input of said system for receiving said periodic signal having a frequency within a predictable range; conditioning circuit means connected to said input to tune said tracking filter to a selected harmonic in said periodic signal; and a programmable frequency multiplier circuit

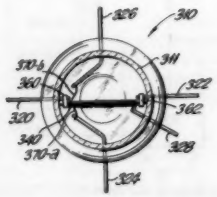
connected to said tracking filter for locking the clock frequency thereof to tune said tracking filter to said selected harmonic of said periodic signal to provide at its output an output signal having the amplitude and corresponding phase of the selected harmonic.

4,695,793

RESISTIVE SENSING THERMAL DEVICE FOR CURRENT MEASUREMENT

Fred L. Katzmann, Cedar Grove, N.Y., assignor to Ballantine Laboratories, Inc., Boonton, N.J.

Filed Feb. 15, 1984, Ser. No. 580,450
Int. Cl.[4] G01R *5/26*; G08B *21/00*; H01C *7/10*
U.S. Cl. 324—106 **15 Claims**



1. In a thermal transfer device for use in the precise measurement of electrical current including an evacuated enclosure containing a first elongate electrical conductor, which conductor is heated by the electrical current being measured, and a thermal sensor that provides an electrical characteristic representative of the temperature of the first electrical conductor, the improvement comprising:

(a) the first electrical conductor being a fine wire formed of a low temperature coefficient of resistivity material;

(b) the thermal sensor being a second elongate fine wire electrical conductor formed of a relatively high temperature coefficient of resistivity material; and

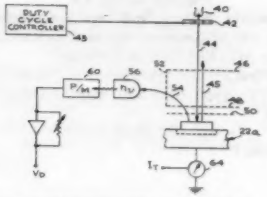
(c) the length of the thermal sensor being thermally coupled with most of the length of the first electrical conductor.

4,695,794

VOLTAGE CALIBRATION IN E-BEAM PROBE USING OPTICAL FLOODING

Charley B. Burgett, Santa Barbara; Roderic L. Osgood, Goleta; Joseph L. Davis, Santa Barbara, and Richard J. Joyce, Thousand Oaks, all of Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed May 31, 1985, Ser. No. 739,832
Int. Cl.[4] G01R *31/28*
U.S. Cl. 324—158 R **23 Claims**



1. Photodiode testing apparatus comprising:

electron-beam source means for generating a beam of primary electrons;

beam control means for directing the beam to a selected diode in a photodiode array;

means for modulating the electron beam to develop predetermined bias voltages at the selected diode;

voltage sensing means responsive to secondary emission electrons from the selected diode for providing output signals which are proportional to the diode bias voltages;

means for directly measuring the induced bias voltages at zero diode current;

means for correlating the measured bias voltages with corresponding output signals from the voltage sensing means; and

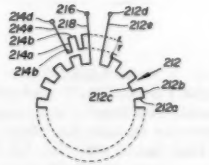
means for illuminating the selected diode on the same side of the diode as the electron-beam source means with a high background level of infrared radiation in order to sharpen the zero crossings of the I–V characteristic curves of the diode during the measurement of the bias voltages at zero diode current.

4,695,795

ROTATION SENSOR WITH CO-PLANAR VELOCITY AND POSITION RESPONSIVE ELEMENTS

Hiromitsu Nakamizo, Tokyo, and Takashi Mochida, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 21, 1984, Ser. No. 684,590
Claims priority, application Japan, Dec. 28, 1983, 58-248923
Int. Cl.[4] G01P *3/48*; G01B *7/30*
U.S. Cl. 324—208 **39 Claims**



1. A rotation sensor comprising:

a first rotary component including a magnetic element having a plurality of first segments arranged about the periphery of said rotary component and generating magnetic fields between each adjacent pair of first segments, and one or more second segments disposed near said first segments and representing a reference angular position of a rotating object, said magnetic element being coupled with said rotating object, the angular motion of which is to be monitored, for rotation therewith; and

a second stationary component on which a first signal generator is cooperative with said first segments of said magnetic element to output a first signal representative of angular motion speed of said rotating object, and a second signal generator is cooperative with said second segments of said magnetic element to output a second signal indicative of the presence of said rotating component in said reference position, said first signal generator being connected to its output terminals via communication lines lying on the same plane, on which said first signal generator is arranged, said communication lines extending across the magnetic field formed by said second segments of said magnetic element and arranged to avoid electromagnetic interaction with said magnetic field formed by said second segments.

4,695,796

MAGNETO-OPTIC MEASURING DEVICE

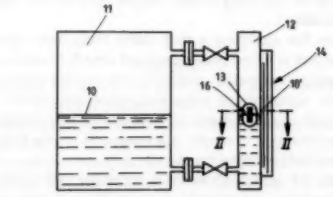
Reinhard Omet, Babenhausen; Hans Kindsvater, Bad Homburg, and Hans J. Wall, Darmstadt, all of Fed. Rep. of Germany, assignors to Phönix Armaturen-Werke Bregel GmbH, Frankfurt, Fed. Rep. of Germany

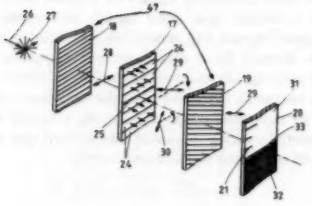
Filed Nov. 9, 1984, Ser. No. 670,142

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1983, 3341265

Int. Cl.[4] G01B *21/00*; **G01N** *27/72*; **G01R** *33/00*

U.S. Cl. 324—226 **17 Claims**





1. A device for measuring physical quantities such as length, angle, position, temperature electric current, comprising means for generating a magnetic field whose parameters are a function of a quantity under measurement; a magnetooptic element arranged for intercepting said magnetic field and for receiving light emitted from a light source, said magnetooptic element producing a Faraday rotation of light passing therethrough; polarizing means optically coupled to said magnetooptic element to detect said Faraday rotation; indicating means for intercepting light emerging from said polarizing means to indicate a value of said quantity under measurement, said polarizing means including a polarizer arranged in the path of light rays before the magnetooptical element, and an analyzer arranged after the magnetooptical element; and said magnetooptic element being assembled of a plurality of superposed rows of a magnetooptic material extending transversely to the path of incident light, said rows forming domains which are uniformly magnetizable by the intercepted magnetic field and being separated by sharp demarkation lines ones from the other, and the polarizing means covering the overall area of the superposed domains.

4,695,797

METHOD OF AND APPARATUS FOR LAYER THICKNESS MEASUREMENT

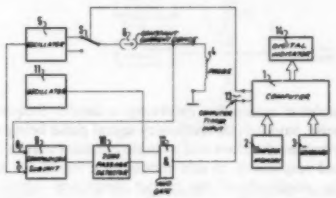
Volker K. Deutsch, Wuppertal, and Werner F. Roddeck, Velbert, both of Fed. Rep. of Germany, assignors to Karl Deutsch Prüf- und Messgerätebau GmbH+Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Feb. 8, 1985, Ser. No. 699,667

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3404720

Int. Cl.[4] G01B *7/10*

U.S. Cl. 324—230 **20 Claims**



1. A method for measuring a thickness of a layer of non-magnetic material on a ferromagnetic base material specimen in accordance with a magnetic inductive process using a probe having a coil therein, said coil having an inductance which varies with respect to a distance between said coil and a ferromagnetic material, wherein a calibration table is stored for said probe corresponding to a curve A reflecting a non-linear relationship between the coil inductance and the distance between the coil and the magnetic material, characterized in that the method comprises the steps:

(a) placing a non-magnetic foil having a known thickness on the non-magnetic material layer on the specimen;

(b) placing the probe on top of said foil;

(c) measuring the inductance of the coil of the probe;

(d) storing said measuring coil inductance and the known foil thickness;

(e) repeating steps (a) through (d) for at least one further foil having a different thickness;

(f) determining difference values for the above measured coil inductances and the known foil thickness;

(g) comparing these difference values with the curve A of the stored calibration table;

(h) generating a curve B offset from said curve A by an amount ov in response to said comparison;

(i) displaying said offset value ov as an initial measurement for the thickness of said layer on said specimen; and

(j) storing said offset value ov for use in subsequent measurements of said specimen.

4,695,798

METHOD AND APPARATUS FOR GENERATING FREQUENCY SELECTIVE PULSES FOR NMR SPECTROSCOPY

Rolf Brandes, Stockholm, Sweden, assignor to The Regents of the University of California, Berkeley, Calif.

Filed Apr. 22, 1985, Ser. No. 725,382

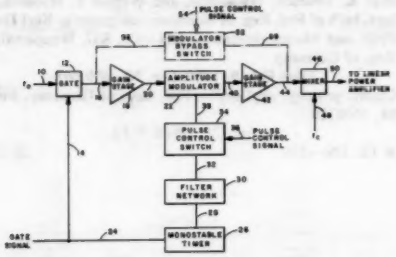
Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—307 **29 Claims**

1. An apparatus for generating a frequency selective output pulse from a carrier frequency signal pulse of a predetermined duration, comprising:

pulse means for generating at least one modulating pulse of predetermined amplitude, duration, and frequency content;

filter means responsive to said modulating pulse for removing selected frequencies from the frequency content of said modulating pulse, said filter means having a predetermined transfer function so as to provide a modulating signal varying in amplitude as a function of time as determined by a filter impulse response; and



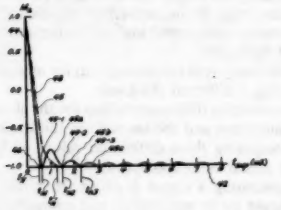
modulator means for receiving a carrier frequency signal pulse, said carrier frequency signal pulse being of a predetermined duration and a single constant carrier frequency, and responsive to said modulating signal for modulating the amplitude of the carrier frequency signal pulse and providing a frequency selective output pulse having a predetermined frequency content centered about the carrier frequency of the carrier frequency signal pulse.

4,695,799

NMR MAGNETIZATION INVERSION BY NON-LINEAR ADIABATIC FAST PASSAGE

Christopher J. Hardy, and William A. Edelstein, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 18, 1985, Ser. No. 746,146
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—307 **11 Claims**



1. A method for complete inversion of magnetization by adiabatic fast passage during an NMR investigation of a sample having a selected nuclear specie with a Larmor frequency ω_O, comprises the steps of:

(a) generating a radio-frequency (RF) magnetic field having an amplitude B_1 and an instantaneous frequency $\omega(t)$;

(b) controlling the frequency $\omega(t)$ to non-linearly sweep as a time function $\omega(t)=\omega_O+\alpha\gamma B_1 \tan(\text{arc}\sin(\omega_s t))$, where γ is the gyromagnetic constant of the selected nuclear specie and $\omega_s=\alpha\gamma B_1$ and $O<\alpha\leqq 1$, during a preselected time interval, from a first frequency, selected from one of a minimum frequency ω_l substantially at a maximum offset frequency $\Delta\omega$ below the Larmor frequency ω_O, and a maximum frequency ω_h substantially at the maximum offset frequency $\Delta\omega$ above the Larmor frequency, through the Larmor ω_O frequency, to a second frequency which is the remaining one of the minimum and maximum frequencies; and

(c) applying the non-linearly swept RF signal to the sample-being-investigated to substantially invert the magnetization of the selected nuclear specie.

4,695,800

NON HARMONIC NMR SPIN ECHO IMAGING

David M. Kramer, Cleveland Heights; Russell A. Compton, Chesterland; Lawrence M. Strenk, Middleburg Hts., and James B. Murdoch, Solon, all of Ohio, assignors to Technicare Corporation, Cleveland, Ohio

Filed Jun. 6, 1985, Ser. No. 742,161
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **17 Claims**

1. Nuclear magnetic resonance apparatus for producing resonance information in the form of first and second spin echo signals in which an initial nuclear magnetic resonance signal is repetitively refocused by successive refocusing radio frequency signals, comprising:

means for applying a static magnetic field to a subject being examined;

means for applying a first radio frequency signal to said subject at a first predetermined time for inducing an initial nuclear magnetic resonance information signal;

means for applying a second, refocusing radio frequency signal to said subject at a second predetermined time for generating a first spin echo signal at a time following said first radio frequency signal: and

means for applying one or more additional radio frequency signals to said subject at respective predetermined times for refocusing the information of said first spin echo signal about a point in time separated from the last of said additional radio frequency signals by a given time interval to form a desired spin echo signal, said additional radio frequency signals also generating undesired signal components derived from earlier-occurring nuclear magnetic resonance signals, and said given time interval not exhibiting a harmonic relationship to the time intervals between ones of said radio frequency signals, whereby there is no substantial overlap in time of said desired spin echo signal by said undesired signal components.

4,695,801

MATCHED GUADRATURE COILS FOR MRI WITH MINIMIZED INTERCOIL COUPLING

Mitsuaki Arakawa, Hillsborough; John H. Fehn, El Sobrante, and Lawrence E. Crooks, Richmond, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

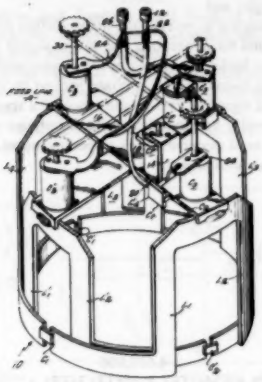
Filed Feb. 10, 1986, Ser. No. 827,609
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—318 **15 Claims**

1. Magnetic resonance imaging apparatus having a quadrature RF coil comprising:

first and second co-located RF coils extending axially and circumferentially about a volume to be imaged but being rotationally offset so as to produce a pair of RF signals from said volume which are in phase quadrature;

said first and second RF coils having a common open end through which objects to be imaged may be inserted along an axis of the apparatus and a common closed end for location of RF coupling and feeding structures;

said first and second RF coils each having respective RF feedlines which extend across respectively associated



perpendicularly disposed diameters of said common closed end.

4,695,802

NUCLEAR MAGNETIC RESONANCE APPARATUS WITH A PERMANENT MAGNET

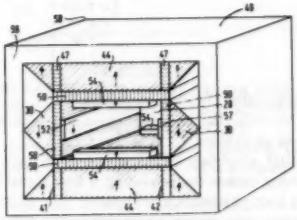
Hinne Zijlstra, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 672,971, Nov. 19, 1984, abandoned. This application Jul. 9, 1985, Ser. No. 753,205

Claims priority, application Netherlands, Jul. 17, 1984, 8402250

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—319 15 Claims



1. A nuclear magnetic resonance apparatus comprising first means for generating homogeneous, main magnetic field in a magnetic field space, second means for generating at least one magnetic gradient field in said field space, means for generating a radio frequency field in said field space and means for detecting a nuclear magnetic resonance signal produced by said radio frequency field in an object under examination disposed in said field space, said first means comprising a plurality of bars of a permanent magnetic material, said bars being laterally magnetized and having planar side surfaces, said bars being disposed about and surrounding an axis extending centrally along said field space so as to define the periphery of said field space having a polygonal cross-section in a plane normal to said axis, with each axially extending peripheral surface of said field space being constituted by a planar surface of a respective bar.

4,695,803

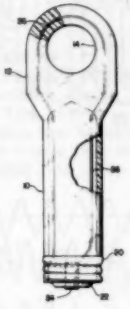
HID LAMP BALLAST TESTER

Robert H. Rue, Christiansburg, Va., assignor to Harvey Hubbell Incorporated, Orange, Conn.

Continuation of Ser. No. 523,105, Aug. 15, 1983, abandoned. This application Feb. 3, 1986, Ser. No. 825,772

Int. Cl.[4] G01R *31/00, 1/22*

U.S. Cl. 324—403 5 Claims



1. A testing device for use with a clamp-on ammeter to measure the short-circuit current output of a ballast circuit connected to an HID lamp socket, comprising

a body of electrically nonconductive material;

a head portion fixedly attached to said body, said head portion having means defining an opening therethrough dimensioned to receive the current-sensing arms of a clamp-on ammeter;

a base attached to said body, said base including contact portions adapted to mate and make electrical contact with the socket to be tested; and

a low resistance wire connected at opposite ends to said connector portions of said base and extending around said opening to be coupled to said ammeter and to form a short-circuit across said socket relative to the impedance of said ballast circuit.

4,695,804

APPARATUS FOR GENERATING A MULTI-FREQUENCY SIGNAL

Artur Bardl, Munich, and Manfred Lindner, Unterhaching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 31, 1985, Ser. No. 761,056

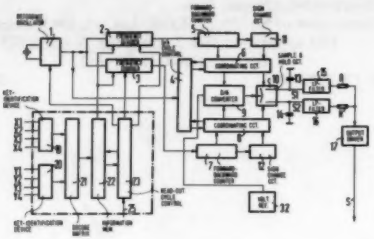
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1984, 3428767

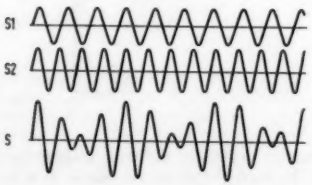
Int. Cl.[4] H03L *7/18;* H03B *21/00*

U.S. Cl. 328—14 5 Claims

1. Apparatus for generating a multi-frequency signal, comprising a digital-to-analog converter, two coordinating circuits connected to said D/A converter for providing different frequency analog-wave information to said D/A converter for determining a respective connecting instant, two forward-/backward counters driven by different frequencies each being connected for controlling a respective one of said coordinating circuits, a D/A cycle control connected to said coordinating circuits for monitoring time connecting instants of said converter circuits to said D/A converter, a sample-and-hold circuit having at least two divider capacitors and being connected

to said D/A converter controlled by said D/A cycle control, and holding capacitors connected to said sample-and-hold





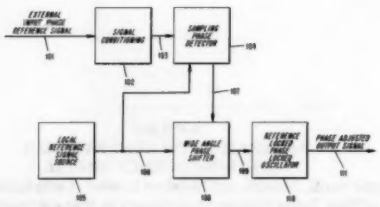
circuit, whereby at least two different frequency analog waves are generated.

4,695,805

APPARATUS FOR GENERATING SIGNALS SYNCHRONIZED TO AN UNSTABLE EXTERNAL SIGNAL

Larry W. Massingill, and Derrick O. Perkins, both of Raleigh, N.C., assignors to OnLine Computer Systems Inc., Germantown, Md.

Filed May 13, 1985, Ser. No. 733,483
Int. Cl.[4] H03K *17/00, 17/26, 5/13*
U.S. Cl. 328—72 **7 Claims**



1. Apparatus for synchronizing an internally generated local reference signal with an externally generated signal having a specific point which may occur periodically or aperiodically to generate a periodic output signal synchronized with the specific point on the externally generated signal comprising:

means for generating the local reference signal;

sampling phase detector means for comparing the externally generated signal against the local reference signal for generating and holding stable between receipt of the specific points on the externally generated signal a sampled phase difference signal, the sampled phase difference signal representing the phase angle at which the previous specific point on the externally generated signal occurs with respect to the local reference signal;

means connected to receive the sampled phase difference signal and the local reference signal for generating a phase shifted local reference clock signal, the phase shifted local reference clock signal having a cycle equal in period to the local reference signal but shifted in phase with respect to the local reference signal by an amount equal to the phase angle; and

means connected to receive the phase shifted local reference clock signal for generating the output signal synchronized and phase locked to the externally generated signal,

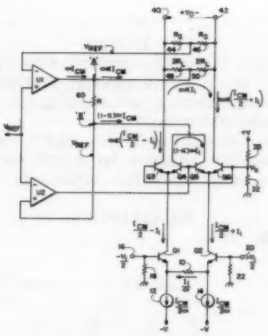
wherein the output signal is phase locked to the externally generated signal at each occurrence of a specific point of the externally generated signal and remains phase locked until the next occurrence of a specific point of the externally generated signal.

4,695,806

PRECISION REMOTELY-SWITCHED ATTENUATOR

Ronald A. Barrett, Westford, Mass., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 15, 1986, Ser. No. 852,476
Int. Cl.[4] H03G *3/30*
U.S. Cl. 330—254 **6 Claims**



1. An attenuator circuit, comprising:

means for receiving an input signal and generating a signal current therefrom;

differential amplifier means coupled to said input signal receiving means for providing a first signal current path and a second signal current path;

attenuation-ratio determining means comprising a first operational amplifier having an output coupled to a first circuit node, load impedance means coupled between said first circuit node and said first signal current path and one input of said operational amplifier to complete a feedback path therefor, and selectable impedance means coupled between said first circuit node and a second circuit node, said second circuit node being connected to said second signal current path, wherein the attenuation ratio is determined by the said load impedance means and said selectable impedance means; and

a second operational amplifier having a first input coupled to a reference potential, a second input coupled to said second circuit node to sense said attenuation ratio, and an output coupled to said differential amplifier means for controlling the proportionality of signal current between said first and second signal current paths in response to the attention ratio sensed at said second circuit node.

4,695,807

CIRCUIT ARRANGEMENT HAVING CLEARING TRANSISTORS FOR DISCHARGING A DARLINGTON STAGE

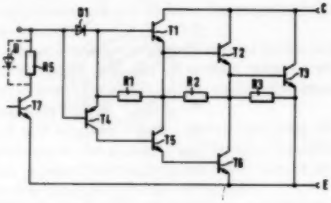
Ralph Annacker, and Joachim Dietl, both of Heilbronn, Fed. Rep. of Germany, assignors to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 838,691

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509595

Int. Cl.⁴ H03F *3/04*; H03K *3/33*

U.S. Cl. 330—310 **4 Claims**



1. A circuit arrangement, comprising:

a Darlington stage which includes a sequence of Darlington transistors; and

means for removing charges during the circuit-breaking of the Darlington transistors, said means for removing the charges including

a plurality of clearing transistors,

means for connecting the clearing transistors in a sequence and for connecting each clearing transistor to the base of a respective Darlington transistor so that the base current of the Darlington transistors preceding the last Darlington transistor travels in each case via the switched-through collector emitter section of a clearing transistor to the base of a following clearing transistor to actuate the following clearing transistor, and

a diode connected between the base of the first transistor in the sequence of Darlington transistors and the base of the first transistor in the sequence of clearing transistors.

4,695,808

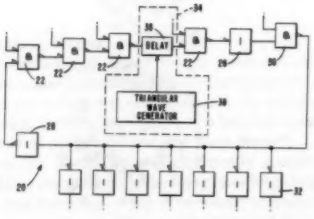
VARYING FREQUENCY OSCILLATOR FOR THE REDUCTION OF RADIATED EMISSIONS OF ELECTRONIC EQUIPMENT

Frank W. Cabaniss, Columbia, S.C., and James M. Lockwood, Mountain View, Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Feb. 27, 1984, Ser. No. 584,269

Int. Cl.⁴ H03B *1/00*

U.S. Cl. 331—57 **5 Claims**



1. In combination with an oscillator for outputting clock signals of a predetermined frequency, an apparatus for reducing interference caused by electromagnetic radiation from said system at said predetermined frequency including delay means for outputting a delay signal for delaying the clock output of the oscillator and signal generator means for modulating the delay signal enabling said oscillator to output clock signals of varying frequencies, said oscillator includes an inverting gate member through which the clock signals are generated and said delay means includes a resistor-capacitor network connected to the input of said inverting gate member for outputting said delay signal which delays the timing of the clock signals outputted by the oscillator.

4,695,809

MICROWAVE SWEEP FREQUENCY OSCILLATOR

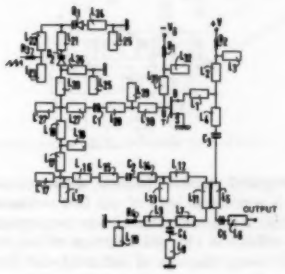
Marie-Irène Rudelle, Aubervilliers, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 23, 1986, Ser. No. 867,349

Claims priority, application France, May 28, 1985, 85 07951

Int. Cl.⁴ H03B *5/18, 23/00*

U.S. Cl. 331—117 D **4 Claims**



1. A microwave-frequency power oscillator swept linearly over a wide frequency range around a central frequency, by means of two variable capacitance diodes, the capacitance of which may be varied depending on a control voltage, and whose cathodes are interconnected via a line element to which said control voltage is applied, said oscillator comprising a transistor whose matching impedances at its input and output electrodes are provided by lines designed to ensure the maximum gain at the central frequency wherein, the working frequency is obtained with a stable transistor operating mode in said frequency range by means of a feedback network matching its input to its output, said variable capacitance diodes being inserted in series between three line elements in a wobbulator circuit arranged in shunt to said feedback network, said line element interconnecting the cathodes, constituting one of said three elements while of the other two elements one end of each is connected to a diode anode, and the respective other ends are connected to a point on the feedback network and to earth, said line elements of the wobbulator circuit being designed to optimise the frequency modulation linearity.

4,695,810

WAFFLELINE-CONFIGURED MICROWAVE TRANSMISSION LINK

Douglas E. Heckaman, Indialantic; Roger H. Higman, Palm Bay; Jeffrey A. Frisco, Palm Bay, and Edward J. Bajgrowicz, Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

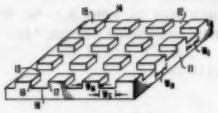
Filed Oct. 22, 1984, Ser. No. 664,876

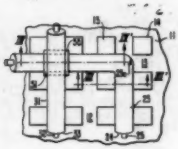
Int. Cl.⁴ H01P *5/00, 3/06*

U.S. Cl. 333—1 **32 Claims**

1. A transmission line structure for effecting signal transmission at microwave frequencies between spaced apart microwave signalling components comprising a plate member at least one side of which is formed with a first plurality of regularly-spaced, parallel channels extending in a first direction, and a second plurality of regularly-spaced, parallel channels

extending in a second direction transverse to said first direction, so as to form, with said first plurality of channels, a waffle-iron-like arrangement of mesa portions each of which extends from a commonly-shared floor for each of said channels to a prescribed height above said floor, the commonly-shared floor, side walls of said channels defined by side walls of said mesa portions, and top land portions of said mesas comprising conductive material and at least one microwave circuit component receiving portion for accommodating at least one microwave circuit component, so that said waffle-iron-like arrangement of mesa portions forms, with signal conductors for connection to said at least one microwave circuit component and disposed in said channels of said first and second pluralities of





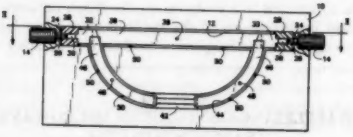
regularly-spaced parallel channels, a transmission line structure that is periodic in both of said first and second directions and provides a constant transmission line impedance irrespective of a change in channel direction of the disposition of a conductor along channels of either of said first and second pluralities of channels, said at least one microwave circuit component receiving portion comprising a pocket recessed in said commonly-shared floor so that channels of said first and second pluralities of channels are interrupted thereby, and wherein the side walls and commonly-shared floor of said channel portions are provided with a layer of insulator material thereon.

4,695,811

HIGH FREQUENCY COAXIAL SWITCH

Heinz E. Grellmann, Beaverton, and Leonard A. Roland, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 28, 1986, Ser. No. 890,044
Int. Cl.[4] H01P *1/10*
U.S. Cl. 333—105 **6 Claims**



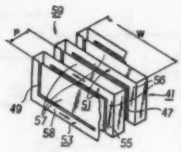
1. A high frequency coaxial switch comprising:
a housing having a cavity;
a hybrid circuit board mounted within the cavity, the hybrid circuit board having a microstrip conductor thereon;
a first coaxial connector mounted on the housing and electrically connected to the microstrip conductor to provide electrical access to the cavity;
a first contact stripline situated within the cavity so as to overlap the microstrip conductor; and
means for moving the first contact stripline to make or break electrical contact with the microstrip conductor.

4,695,812

ELECTROMAGNETIC DELAY LINE WITH INDUCTANCE ELEMENT WITH TRANSVERSELY STAGGERED STACKED CONDUCTING PORTIONS

Kazuo Kameya, Tsurugashima, Japan, assignor to Elmec Corporation, Saitama, Japan

Filed Mar. 14, 1986, Ser. No. 839,578
Claims priority, application Japan, Mar. 15, 1985, 60-52670; Jul. 9, 1985, 60-151488
Int. Cl.[4] H01P *9/00*; H03H *7/34*
U.S. Cl. 333—156 **21 Claims**



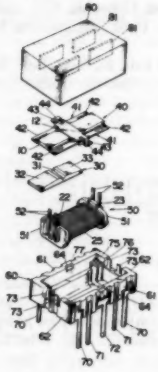
1. A distributed constant type delay line, comprising:
(a) an inductance element comprising a plurality of essentially parallel stacked plates which are conducting and connected in series, said stacked plates being defined by a first and a second set of plates, individual plates of said first set of plates being stacked to alternate with individual plates of said second set of plates, each of said stacked plates having a longitudinal axis, the longitudinal axes of the first set of plates defining a first plane essentially perpendicular to the parallel stacked plates, the longitudinal axes of the second set of plates defining a second plane essentially perpendicular to the parallel stacked plates, said first plane being spaced from said second plane;
(b) a ground electrode interposed between adjacent parallel stacked plates; and
(c) a dielectric layer interposed between said ground electrode and said parallel stacked plates.

4,695,813

POLARIZED ELECTROMAGNETIC RELAY

Kazuhiro Nobutoki, and Kenji Ono, both of Matsusaka, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Mar. 6, 1986, Ser. No. 836,735
Claims priority, application Japan, Mar. 25, 1985, 60-60087
Int. Cl.[4] H01H *51/22*
U.S. Cl. 335—78 **7 Claims**



1. In a polarized electromagnet relay including:
a casing;

an elongate armature pivotally supported at its central portion to be movable about a center pivot axis for angular movement between two contact operating positions;

an electromagnet received in the casing, said electromagnet having a core, exciter coil means about the core, and a pair of pole members extending from the ends of the core toward the ends of the armature on either side of the pivot axis;

a bar-shaped three-pole magnetized permanent magnet disposed between the free ends of the pole members in closely adjacent relationship to the armature, said permanent magnet being magnetized to have the same poles at its lengthwise ends and to have the opposite pole intermediate its end;

a pair of movable contact springs carried by the armature to be moved into and out of contact with corresponding fixed contacts mounted on the casing; the improvement comprising:

each of said movable contact spring extending along each lateral side of the armature and fixedly connected thereto at the portion intermediate the ends thereof so as to be movable together with the armature,

each movable contact spring being formed at the intermediate portion thereof with a transversely extending pivot arm which joins fixedly with a portion of the casing,

said pivot arm being integral with the movable contact spring to define itself a resilient torsion element of limited deformability whereby the armature is permitted to pivot about the axis of the pivot arms for movement between the two contact operating positions.

4,695,814

CIRCUIT BREAKER

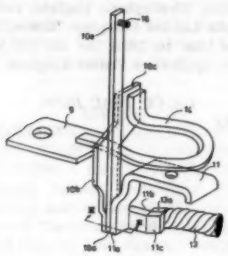
Matsumoto Yoshiaki; Shinji Yamagata, and Kazuyoshi Sugihara, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 3, 1986, Ser. No. 870,326

Claims priority, application Japan, Jun. 27, 1985, 60-97958[U]

Int. Cl.⁴ H01H *71/16, 75/08*

U.S. Cl. 337—77 **4 Claims**



1. A circuit breaker, comprising:

a thermal tripping device having a bimetal element and a heater, said heater being juxtaposed adjacent said bimetal element to heat the same primarily by radiated heat;

a holding member for holding said bimetal element and said heater at respective first end parts thereof;

arm means, thermally and electrically connected to said holding member, for generating heat by providing electrical resistance to flowing of over-current therethrough and for thermally conducting said generated heat to said first end part of said bimetal element; and

a flexible copper wire connected to said arm for flowing current thereto.

4,695,815

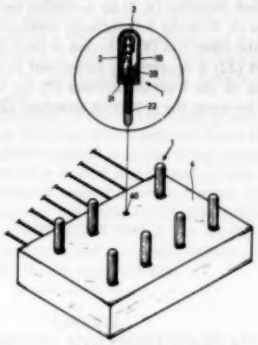
AUTOMOBILE FUSE WITH DAMAGE INDICATOR

Chern Hwang, 8, Lane 158, Nan Gang Rd., Nan Gang District, Taipei, Taiwan

Filed May 7, 1985, Ser. No. 731,385

Int. Cl.⁴ H01H *85/32*

U.S. Cl. 337—266 **5 Claims**



1. An automobile fuse with damage indicator means comprising

a cylindrical, transparent shell having an open end and a closed end;

a pin comprising a pair of conductors separated by an insulator, the pin having an upper end and a lower end, the upper end being inserted into the open end of the shell to form a sealed portion; and

disposed within the sealed shell portion, a fusible link and an indicator bulb in electrical connection with the pair of conductors.

4,695,816

THERMAL CUT-OUT

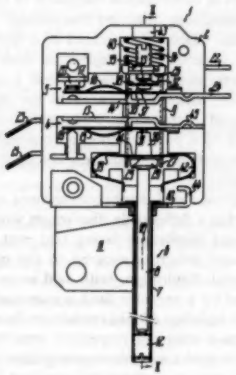
Willi Essig, Böblingen, and Heinz Petri, Bretten, both of Fed. Rep. of Germany, assignors to E.G.O. Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany

Filed Nov. 13, 1986, Ser. No. 930,862

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540414

Int. Cl.⁴ H01H *37/48*

U.S. Cl. 337—394 **35 Claims**



1. A thermal cut-out (1) for a heating means, said cut-out

having a substantially rod-like temperature sensor (6) for operating a signal switch (4) and a power switch (5) arranged in a base (2) for switching off the heating means at a predetermined maximum temperature, said temperature sensor having an outer tube (7) and an inner rod (8) located therein, a transfer member (9) continuately arranged to a socket-side end of the inner rod (8) being provided for acting on actuating points (31, 37) of both switches (4, 5) by actuating members (30, 32), said switches (4, 5) being substantially arranged in a length extension of the inner rod (8), wherein at least one of the actuating members (32) is operatively connected to an adjusting device provided on the transfer member (9) for varying the relative spacing between the actuating members (30, 32).

4,695,817

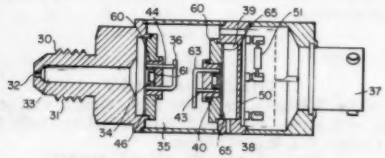
ENVIRONMENTALLY PROTECTED PRESSURE TRANSDUCERS EMPLOYING TWO ELECTRICALLY INTERCONNECTED TRANSDUCER ARRAYS

Anthony D. Kurtz, Teaneck, and Joseph R. Mallon, Franklin Lakes, both of N.J., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Filed Jun. 26, 1985, Ser. No. 748,836

Int. Cl.[4] G01L *1/22*

U.S. Cl. 338—4 **24 Claims**



1. A pressure transducer apparatus of the type containing first and second transducer structures each contained in a housing and each associated with a separate pressure port, the improvement in combination therewith of an environmentally protected transducer structure comprising:

a first metal diaphragm secured to a first pressure port to provide a deflectable diaphragm, with a first surface of said metal diaphragm facing said port, with said first transducer structure secured to the opposite surface of said metal diaphragm, with said first transducer surrounded by a pressure fluid accommodating assembly to provide isolation of said transducer structure from said first port,

with a second metal diaphragm secured to said second port to provide a deflectable diaphragm with a first surface of said metal diaphragm facing said port, with said second transducer structure secured to the opposite surface of said metal diaphragm, with said second transducer surrounded by a pressure fluid accommodating assembly to provide isolation of said transducer from said second port and means coupling respective sensors of said first and second transducer structures together to form a compensated array where the voltage output is indicative of the pressure applied to one port as referenced to said other port.

4,695,818

ELECTRICAL RESISTOR WITH A NEGATIVE TEMPERATURE COEFFICIENT FOR INCREMENTAL RESISTANCE VALUES AND METHOD FOR MANUFACTURING SAME

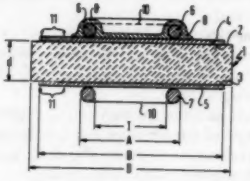
Gerald Kloiber, Feldkirchen/Graz, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 14, 1986, Ser. No. 829,622

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1985, 3508163

Int. Cl.[4] H01C *7/10, 1/144*

U.S. Cl. 338—22 R **5 Claims**



1. An NTC resistor comprising:

a wafer consisting of densely sintered metal oxide ceramic having a diameter in the range of from about 1.5 mm through about 5.0 mm, a thickness in the range of from about 0.6 mm through about 2.5 mm, and having two opposite major faces;

solderable metal coatings respectively substantially covering and adhering to said major faces; and

two current lead elements respectively secured to each metal coating with solder, each lead element having a closed annular eye centrally disposed on said major face adjacent said coating, said annulus eye having a diameter which is less than about 60% of the diameter which of said coating and said solder being substantially coextensive with said annulus eye leaving a solder-free edge of said coating.

4,695,819

PEDAL DEVICE

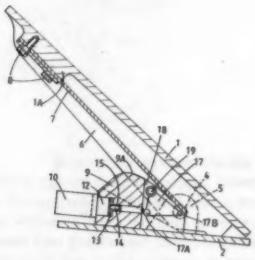
Glynne T. Bowsher, Birmingham, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Mar. 14, 1986, Ser. No. 839,550

Claims priority, application United Kingdom, Mar. 21, 1985, 8507300

Int. Cl.[4] H01C *10/00*

U.S. Cl. 338—153 **20 Claims**



1. A pedal device comprising:

a pedal pivotally mounted for rotation about a pivot axis;

a leaf spring mounted on said pedal in a cantilever manner;

a bearing means;

a bearing surface on said bearing means engageable with said leaf spring and having a configuration and location relative to said leaf spring so that the position of engagement

varies during rotation of said pedal to produce a predetermined ratio between pedal movement and pedal load depending on said position of engagement; and

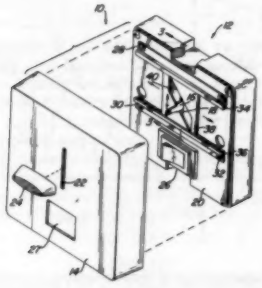
an output device mounted in a position relative to said pedal and adapted to be operated by said pedal for producing an electrical output in response to pedal rotation movement.

4,695,820

SAFETY DEVICE FOR APPARATUS HAVING RELATIVELY MOVABLE MEMBERS

Michael J. D'Aleo, Ottsville, and Mark Smaich, Allentown, both of Pa., assignors to Lutron Electronics Co. Inc., Coopersburg, Pa.

Filed Mar. 13, 1986, Ser. No. 839,303
Int. Cl.[4] H01C *10/38*
U.S. Cl. 338—179 **16 Claims**



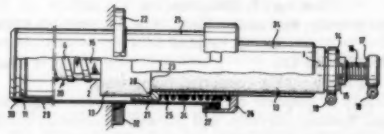
1. In electrical control apparatus having a first member disposed in an opening in a second member, the first and second members being adapted and arranged for relative movement with respect to each other, means for covering the open portions of the opening as the first member moves relative to the opening, comprising primary shield means adjacent to and overlapping the opening, the primary shield means being operatively associated with the first member for transverse movement relative to the opening in response to movement of the first member, the primary shield means having a shape adapted to permit unrestrained movement of the first member while substantially overlapping the open portions of the opening for all positions of the first member in the opening.

4,695,821

RESISTOR ELEMENT ASSEMBLY FOR A HEATING FURNACE OF GLASS SHEETS AND METHOD OF REPLACING A RESISTOR ELEMENT

Pauli T. Reunamäki, Nattari; Erkki P. J. Yli-Vakkuri, and Kauko K. Anttonen, both of Tampere, all of Finland, assignors to O/Y Kyro A/B Tamglass, Tampere, Finland

Filed Dec. 16, 1985, Ser. No. 809,341
Claims priority, application Finland, Jan. 3, 1985, 850026
Int. Cl.[4] H01C *10/16*
U.S. Cl. 338—316 **6 Claims**



1. A resistor element assembly for a heating furnace of glass sheets, comprising:

an elongated resistor element extending in a longitudinal direction and having a first end and a second end, said resistor element including

a plurality of elongated ceramic elements positioned successively in said longitudinal direction,

a resistance wire wound into wire coils around said ceramic elements, said wire coils having a diameter, and

a plurality of ceramic spacer blocks positioned between said ceramic elements, said blocks having a diameter exceeding said diameter of said wire coils,

a support frame having a first end, a second end and a limit stop at said second end, said support frame carrying said resistor element by providing a resting surface for said spacer blocks, and

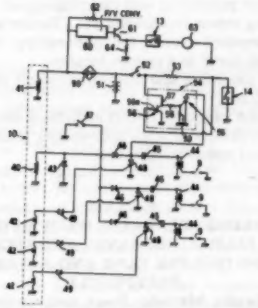
a first spring positioned between said first end of said resistor element and said first end of said support frame for compressing said resistor element at all operating temperatures against said limit stop at said second end of said support frame, said elongated resistor element further including means for urging said plurality of elongated ceramic elements and said spacer blocks toward one another in said longitudinal direction at least when said resistor element is not being carried in said support frame.

4,695,822

OVERHEAT WARNING AND PREVENTION SYSTEM FOR OUTBOARD ENGINES

Naoki Furukawa, Shizuoka, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jan. 29, 1982, Ser. No. 343,837
Claims priority, application Japan, Feb. 6, 1981, 56-16371
Int. Cl.[4] G08B *21/00*; **F02B** *9/00*
U.S. Cl. 340—53 **7 Claims**



1. A system for warning of and preventing overheating of an engine of the type having coolant conduits through which coolant water under pressure is circulated to cool said engine comprising;

a plurality of cylinders in said engine, each of said cylinders having a spark plug;

low pressure-responsive sensor means exposed to and sensing said coolant water pressure;

engine RPM responsive means detecting the RPM of said engine and providing an output when said engine RPM is above a predetermined amount;

warning means connected to said low pressure-responsive sensor means and said engine RPM responsive means for providing a warning when said coolant water pressure is below a predetermined amount and said engine RPM is above a predetermined amount;

a high-temperature-responsive sensor exposed to said coolant water;

engine disabling means connected to said high-temperature responsive sensor adapted to partially disable said engine when said coolant water temperature exceeds a predetermined temperature; said engine disabling means interrupt-

ing an ignition spark to one or more of said spark plugs when said coolant water temperature exceeds a predetermined level and restoring said ignition spark to said one or more spark plugs when said coolant water temperature falls below said predetermined level;

whereby a warning is given when said coolant water pressure and RPM are such that overheating can occur and said engine disabling means provides reduced power output and engine RPM should overheating occur.

4,695,823

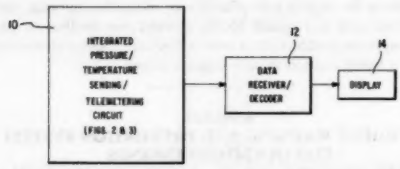
VEHICLE TIRE MONITORING APPARATUS

Roger W. Vernon, Box 608, Georgetown, Colo. 80444

Filed Apr. 27, 1984, Ser. No. 604,934

Int. Cl.[4] B60C *23/00, 23/02*

U.S. Cl. 340—58 **6 Claims**



1. An integrated circuit monitor for telemetering data such as temperature or pressure from a vehicle tire comprising

sensing means constituting an integral part of an integrated circuit for transducing a sensed parameter to an electrical signal;

means constituting a further integral part of said integrated circuit for processing said electrical signal;

transmitting means constituting yet a further integral part of said integrated circuit for transmitting the processed, electrical signal to a remote location;

means for mounting said integrated circuit with respect to said tire; and

whereby said integrated circuit includes as integrated circuit elements thereof at least said sensing means, processing means and transmitting means.

4,695,824

INK STORING APPARATUS WITH A FIRST CASE HAVING PLURAL INK TANKS AND SECOND CASE HAVING ONE INK TANK AND A WASTE INK RECEPTACLE

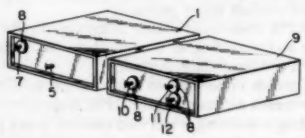
Shigemitsu Tazaki, Matsudo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 489,092, Apr. 27, 1983, abandoned. This application Oct. 10, 1985, Ser. No. 786,176

Claims priority, application Japan, May 10, 1982, 57-76617

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **10 Claims**



1. An ink storing apparatus for a printing device, the apparatus comprising:

at least one first ink storing means including a first case for storing a first ink and being detachably connectable with the printing device; and

a second ink storing means including a second case integrally having a first storing portion for internally storing a second ink and a second storing portion for storing waste ink, said second ink storing means being detachably connectable with the printing device, wherein said first ink storing means and the printing device remain connected when said second ink storing means is disconnected from the printing device and wherein said second ink is preselected to be used at a faster rate than said first ink.

4,695,825

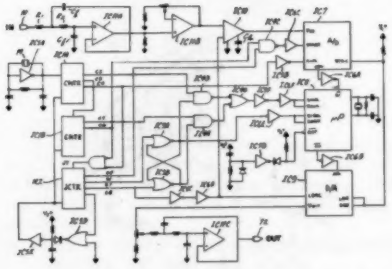
ANALOG-DIGITAL CONVERSION SYSTEM

Graham P. Bloy, St. Louis, Mo., and John L. Miramonti, County of Oakland, Mich., assignors to Metme Communications, St. Louis, Mo.

Filed Apr. 28, 1986, Ser. No. 856,832

Int. Cl.[4] H03M *1/02*

U.S. Cl. 340—347 SH **12 Claims**



1. In an analog-digital conversion system for receiving analog input signals and converting such input signals to digital form for further processing by digital processing apparatus during repetitive cycles including a sample-and-hold circuit for periodically sampling the value os such input signals and an analog-to-digital converter for converting the sampled input signals into digital format, the improvement characterized by timing circuitry for generating a plurality of control signals during each such cycle for controlling the sample-and-hold circuit, the analog-to-digital converter and the processing apparatus, said timing circuitry comprising means for selectively shortening the duration of at least one interval associated with such control signals, the timing circuitry comprising an oscillator and resettable counter means driven by the oscillator for proving counter output defining a plurality of successive timing states which together define each such repetitive cycle, the means for selectively shortening duration comprising means responsive to count signal output of the counter means for resetting of the counter means for accelerated termination of the last timing state in each such cycle, whereby to reduce average total duration of each such cycle by accelerating the beginning of each such cycle.

4,695,826

HIGH ACCURACY DIGITAL-TO-ANALOG CONVERTER HAVING SYMMETRICAL CURRENT SOURCE SWITCHING

Hideki Ando, and Takahiro Miki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 848,562

Claims priority, application Japan, Apr. 17, 1985, 60-82930

Int. Cl.[4] H03M *1/74*

U.S. Cl. 340—347 DA **4 Claims**

1. A digital-to-analog converter, comprising:

a plurality of constant current sources adapted to generate equal constant currents, said plurality of constant current sources being arrayed in a prescribed order;

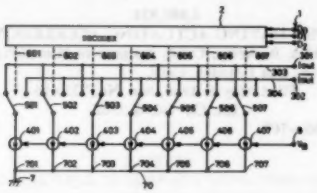
a grounding conductor haivng an internal resistance distributed along its length and connected with said constant current sources so that currents generated from respective

ones of said plurality of constant current sources flow into different positions of said grounding conductor along said array of constant current sources, an end of said grounding conductor being grounded;

a first bus including an output terminal for analog signals generated by said converter;

a second bus including an output terminal for analog signals complementary to said converted analog signals;

a plurality of switching means respectively provided in



correspondence to said constant current sources for switching said first bus and said second bus to obtain currents flowing into said constant current sources;

decoder means for decoding input digital signals thereby to output switching control signals for respective ones of said switching means; and

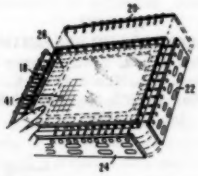
control means for controlling said switching means in response to said decoder means to switch said plurality of constant current sources symmetrically with respect to the center of said array to said first bus.

4,695,827

ELECTROMAGNETIC ENERGY INTERFERENCE SEAL FOR LIGHT BEAM TOUCH PANELS

August H. Beining, Fullerton; Larry A. Dial, Diamond Bar; William A. Smith, and Gene W. Rieck, both of Laguna Hills, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 20, 1984, Ser. No. 673,311
Int. Cl.[4] G08C *21/00*
U.S. Cl. 340—365 P **30 Claims**



30. Electromagnetic energy interference sealing apparatus for a light beam touch panel system having a matrix of crossed light beams formed in front of the face of a display device by pairs of opposing light beam sources and light beam detectors used to establish the position of an object inserted into said matrix, the sorces and detectors being arrayed around the periphery of the display device, the sealing apparatus being used for sealing of the system including the display device, sources and detectors, the sealing apparatus comprising:

an electromagnetic interference sealing means including an embedded conductive mesh across the face of said display device;

means including a bezel enclosing said display device;

an electrically conductive strip disposed about said periphery between said bezel and said sealing means and having a plurality of spaced apart aperture means formed therethrough which are disposed in optical alignment with the light beams for passing the light beams therethrough;

the aperture means each having a cross-section size-to-length ratio selected so that each said aperture means acts as a waveguide having a cutoff frequency which is lower than the frequency of the passing light beams and is higher than the frequency of electromagnetic energy interference;

means for electrically connecting said wire mesh to said conductive strip; and

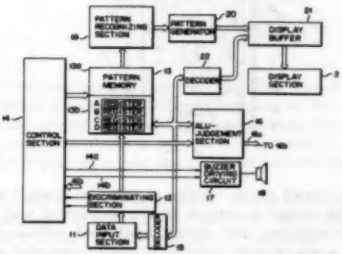
environmental sealing means disposed across each said aperture means for sealing each said aperture means for environmental contaminants.

4,695,828

ELECTRONIC APPARATUS FOR ENTERING PATTERN DATA BY FINGER ACTIVATION

Haruo Yamamoto, Sayama, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1983, Ser. No. 514,312
Claims priority, application Japan, Jul. 23, 1982, 57-128614
Int. Cl.[4] G06F *3/02*
U.S. Cl. 340—365 S **7 Claims**



1. An electronic apparatus for entering a pattern data by activating a matrix array of keys with a finger comprising:

pattern data input means having matrix array keys;

means connected to said pattern data input means for detecting the "on"-"off" state of said keys;

means having an input connected to said "on"-"off" state detecting means, for measuring a time interval beginning from the release of a key in the pattern data input means and ending at the depression of a different key therein;

means connected to said time interval measuring means and having a display means driven according to the measured time interval for providing a display indicative thereof;

means for storing a reference time interval signal;

means connected to said time interval measuring means and said storing means, for comparing a signal from said time interval measuring means and said reference time interval signal from said storing means;

pattern recognition in means coupled between said time interval measuring means and said display means, for causing said display means to display input pattern data entered with a finger when said comparing means detects the coincidence of said measured time interval signal and said reference time interval signal.

4,695,829

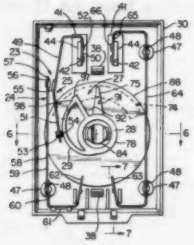
TEMPERATURE LEVEL INDICATING DEVICE AND METHOD OF MAKING THE SAME

Charles J. Everett, Clinton, and Rolf H. Ochsner, Trumbull, both of Conn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 9, 1985, Ser. No. 690,034
Int. Cl.[4] G08B *17/00*
U.S. Cl. 340—586 **11 Claims**

1. In a device for indicating that a sensed temperature has reached a certain selected level, said device comprising a

housing means carrying an electrical switch means for operating an indicator means to one condition thereof when said switch means is closed and to another condition thereof when said switch means is open, said switch means comprising a first movable contact means and a second movable contact means which when in contact with each other close said switch means and when out of contact with each other open said switch means, said first contact means having means for moving the same relative to said second contact means in relation to said sensed temperature, and selector means rotatably carried by said housing means for selecting said certain level and having setting means operatively interconnected to said second contact means to position the same relative to said first contact means in relation to the selected level, the improvement wherein said selector means and said setting means comprise a one-piece selector member having a peripheral cam surface engaging said second contact means to position said



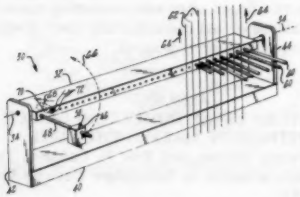
second contact means relative to said first contact means as said cam surface is rotated by the rotation of said selector member selecting said certain level, said selector member having a substantially cylindrical portion provided with opposed ends, said housing means having a cylindrical projection provided with an internal annular surface, said cylindrical projection telescopically receiving one of said ends of said cylindrical portion therein to rotatably mount said selector member to said housing means by said one end rotatably engaging said internal annular surface of said cylindrical projection, said housing means having a snapfit projection extending concentrically out of said cylindrical projection in radially inwardly spaced relation to said internal annular surface of said cylindrical projection, said cylindrical portion having an opening passing therethrough and through said ends thereof, said snap-fit projection extending into said opening and being snapfitted to the other of said ends of said cylindrical portion.

4,695,830

WIRE RUNTOGETHER SENSOR

Randall C. Graham, Nashville, Tenn., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Oct. 18, 1985, Ser. No. 788,903
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—677 **3 Claims**



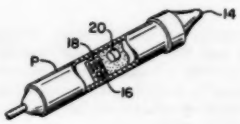
1. A runtogether sensor, comprising:
two opposed vertical support members;
a beam supported between the support members;
a plurality of parallel rigid tines extending outwardly horizontally from the beam for insertion between a plurality of vertical parallel wires in motion undergoing enamelling;
a counter-balance motion on the beam for precisely balancing the beam such that the tines are horizontal; and
a switch, responsive to movement of the beam induced by a tine forced in motion by a pair of stuck together wires moving past the tine for providing a signal indicative of a runtogether condition.

4,695,831

LIGHT PEN HAVING ACTUATING ACCELEROMETER

Alan L. Shinn, Berkeley, Calif., assignor to Humphrey Instruments, Inc., San Leandro, Calif.

Filed May 6, 1985, Ser. No. 731,416
Int. Cl.[4] G09G *3/02*
U.S. Cl. 340—707 **3 Claims**



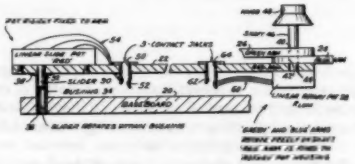
1. In the combination of a cathode ray tube display having a transparent screen, a raster for writing to said display and a light pen having a photosensor for detecting raster passage from the front of said cathode ray display and relaying raster passage to software logic interior of a computer; and a switch in combination with said light pen for gating a signal from said photosensor to circuitry for locating position of said photosensor in relation to said display, the improvement to said switch including an accelerometer mounted to said light pen actuated by the tapping of said light pen on the transparent screen of said CRT, said accelerometer including a mass movably mounted to said light pen and a transducer for detecting movement of said mass upon acceleration of said light pen upon tapping said light pen, and actuating said switch in response thereto.

4,695,832

ANALOG COLOR SELECTOR

Dov Jacobson, Staten Island, N.Y., assignor to Time Video Information Services, Inc., New York, N.Y.

Filed Nov. 7, 1983, Ser. No. 549,564
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—709 **13 Claims**



1. An analog color selector for connection to a video display for selection among colors defined by a continuum of values of each of three selected independent variables and having a capability of instantaneous on-screen color selection at any specific location on a screen of the video display, said selector comprising a control element capable of being moved throughout a predetermined region, said region having at least two geometric dimensions, and a plurality of generating means connected to said control element for generating electrical signals representative of electrical signal an instantaneous position of said control element within said region, with each

electrical signal generating means being capable of varying the value of the electrical signal produced based upon movement of the control element within said region, and with each position of said control element within said region being indicative of at least a first and a second independent variable of a specific color capable of being presented at a specific location on the screen of the video display.

4,695,833

MAN-MACHINE INTERFACE TYPE PORTABLE ULTRASONIC COMPOSITE MEASURING APPARATUS

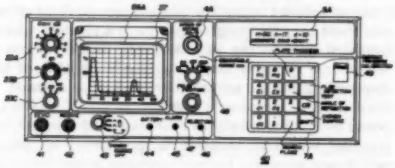
Yukio Ogura, Amimachi, and Seiji Nasu, Hitachi, both of Japan, assignors to Hitachi Construction Machinery Co., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan

PCT No. PCT/JP83/00094, § 371 Date Nov. 13, 1984, § 102(e) Date Nov. 13, 1984, PCT Pub. No. WO84/03944, PCT Pub. Date Oct. 11, 1984

PCT Filed Mar. 28, 1983, Ser. No. 673,704

Int. Cl.⁴ G09G *1/00*

U.S. Cl. 340—722 **1 Claim**



1. A man-machine interface type portable ultrasonic composite measuring apparatus comprising:

a keyboard device for designating a certain mode from among a plurality of ultrasonic composite measuring modes;

a microcomputer having a plurality of processing programs respectively corresponding to said plurality of composite measuring modes, and which reads one of said processing modes which corresponds to said mode designated by the keyboard device, and which processes specified information consisting of a measurement procedure, a measurement object and a measurement position, in accordance with the read-out processing program, and which takes in external measured information to be stored as measurement data;

a display unit for displaying said measurement procedure, said measurement object and said measurement position obtained during said processing by said microcomputer;

an oscilloscope device for directly displaying in real-time responsive observation wave signals relating to an object to be inspected, obtained in accordance with the displayed content in said display unit, from an ultrasonic probe, without storing them;

a transparent position-detecting panel which is mounted on a display surface of said oscilloscope device and which inputs coordinate signals of designated points on said responsive observation signal waveform displayed on said display surface;

and an A-D converter for converting coordinate signals inputted from said panel into digital signals and for sending said converted coordinate signals to the microcomputer as measurement information.

4,695,834

PATTERNED LINE GENERATOR FOR A DATA PROCESSING DEVICE

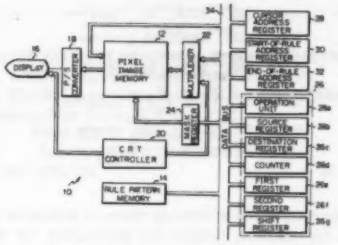
Tomomi Gojo, Zama; Yoshio Yagi, Hatano, and Tsunetada Izumi, Sagamihara, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Feb. 14, 1985, Ser. No. 701,612

Claims priority, application Japan, Feb. 14, 1984, 59-25698

Int. Cl.⁴ G09G *1/16*

U.S. Cl. 340—734 **6 Claims**



1. A data processing device having input means, pixel image memory means for storing data corresponding to data to be displayed and control means for storing a particular line in the pixel image memory means in response to a command entered through the imput means, said data processing device comprising:

particular line pattern store means for storing basic patterns representative of a plurality of particular lines extending in a first direction and a plurality of particular lines extending in a second direction, the first and second directions corresponding respectively to vertical and horizontal directions of an image data store area of the pixel image memory means;

particular line pattern transfer means including pattern selecting means for selecting one of the basic patterns stored in said particular line pattern store means and including moving means for moving the selected basic pattern from said particular line pattern store means to the pixel image memory means; and

position control means for positioning said selected pattern by storing the start address of the selected pattern, storing the start address of the line to be drawn in the pixel image memory means and causing the selected pattern to be moved into the pixel image memory means at sequential memory positions contiguous with the start address in memory.

4,695,835

DATA DISPLAY SYSTEMS

Richard E. F. Bugg, Coulsdon, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 17, 1983, Ser. No. 552,654

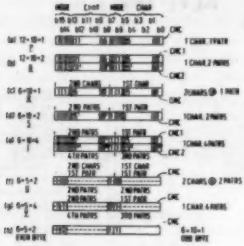
Claims priority, application United Kingdom, Nov. 19, 1982, 8233114

Int. Cl.⁴ G09G *1/16*

U.S. Cl. 340—750 **12 Claims**

1. A data display system for displaying data represented by digital codes, the displayed data being composed of discrete characters the shapes of which are determined by selected dots of a dot matrix which constitutes a character format for the characters, said system comprising a character memory which stores character information which conforms to different character modes of the form $m \times n \times b$, where $m \times n$ is a bit matrix format which is repeated b times to provide b-bits per displayed character dot of the characters concerned, said system being characterized in that the stored character information for each character includes more bits which determine the charac-

ter mode and include (a) character shape, (b) character resolution for a given character size, and (c) character color, and logic control and addressing means are provided for reading out from a first address said mode bits along with dot information for a selected character dot row contained in one bit matrix for the mode and wherein said mode bits are used by



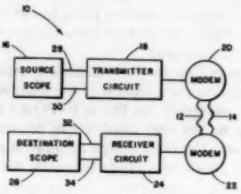
said logic control and addressing means to determine a second address for selecting further dot information for the same character dot row in the same or a second bit matrix for the mode, the addressing being organized so that the first address has the same address format irrespective of the relative sizes of the m×n×b character modes.

4,695,836

METHODS OF AND SYSTEMS FOR TRANSMITTING OSCILLOSCOPE SIGNALS

Robert W. Everhart, Columbus, and Charles T. Huck, Gahanna, both of Ohio, assignors to American Telephone and Telegraph Company AT&T-Technologies, Berkeley Heights, N.J.

Filed Mar. 7, 1985, Ser. No. 709,490
Int. Cl.[4] G09G *1/14*
U.S. Cl. 340—750 **11 Claims**



1. A real-time data acquisition and communication system, which comprises:

means for generating vertical and horizontal component signals in response to a continuous or transient analog signal;

first means for converting each of the component signals into digital equivalent signals;

first means, responsive to the first converting means, for storing words in memory at addresses identified by clock signals with each word storing the digital equivalent signals identifying both the vertical and horizontal component signals;

means for transmitting the digital equivalent signal words to a remote location;

second means for storing the digital equivalent signal words at the remote location; and

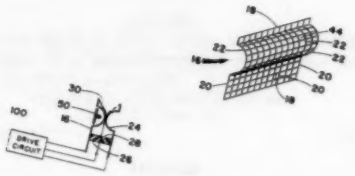
second means, responsive to the second storing means, for converting the digital equivalent signal words into an analog signal.

4,695,837

ELECTROSTATIC DISPLAY DEVICE WITH IMPROVED FIXED ELECTRODE

Charles G. Kalt, 29 Hawthorne Rd., Williamstown, Mass. 01267

Continuation-in-part of Ser. No. 299,804, Sep. 8, 1981, Pat. No. 4,468,663. This application Mar. 7, 1984, Ser. No. 587,313
Int. Cl.[4] G09G *3/16*
U.S. Cl. 340—763 **16 Claims**



1. An electrostatic display device, comprising:

(a) conductive flexible movable flapper means;

(b) first support means for supporting said movable flapper means at a bending point at one end of said flapper means and with an opposite end of said flapper means as a free end;

(c) a conductive fixed electrode element having insulation disposed over one of its faces to define an insulated face;

(d) second support means for supporting said fixed element, said fixed element being supported in a position with said insulated face facing said movable flapper means and where said movable flapper means is capable of being disposed against or spaced from said fixed element, said fixed element including a plurality of raised surfaces disposed over substantially all of its insulated faces to define together with said movable flapper means air passages which communicate between ambient atmospheric pressure and the side of said movable flapper means disposed against said fixed element when said flapper means is disposed against said fixed element; and

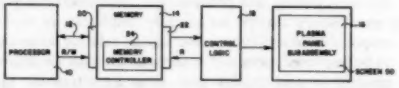
(e) electrical drive means coupled to said fixed electrode and said flapper means for moving said movable flapper means between a first position where said flapper means bears against and covers said fixed element and a second position where said flapper means exposes said fixed element.

4,695,838

PLASMA PANEL DISPLAY SELECTIVELY UPDATABLE ON PEL LINE BASIS

Joseph J. Ellis, Jr., West Hurley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1985, Ser. No. 729,013
Int. Cl.[4] G09G *3/28*
U.S. Cl. 340—771 **4 Claims**



1. A display system comprising:

a processor,

a plasma display panel assembly including generally orthogonally related conductor arrays and drive circuits for each conductor in said arrays,

control logic and a read-write memory for storing image data from said processor and delivering drive information to the said plasma panel assembly,

said control logic being adapted for time sharing said read-

write memory between said processor and said plasma display panel assembly,

means for providing a plurality of data tags associated with the operation of said read-write memory to identify data changes to be displayed,

each line of said display having an associated data tag,

means for modifying said data tags to identify data lines to be updated, and

control means responsive to said modified data tags to control update, erase and write operations on said plasma display panel assembly on an individual line basis.

4,695,839

SLAVE-TYPE INTERFACE CIRCUIT OPERATING WITH A SERIES BUS

Stefan Barbu, Caen, France; Léonardus Valkestijn, and Franciscus A. M. van de Kerkhof, both of Ba Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 4, 1985, Ser. No. 741,090

Claims priority, application France, Jun. 8, 1984, 84 09064

Int. Cl.[4] H04Q *1/00*

U.S. Cl. 340—825.06 **15 Claims**

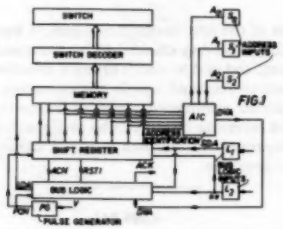


FIG.1

1. A slave type interface circuit for attaching to a serial bus having a data signal line (SDA) and a clock signal line (SCL), said circuit comprising:

a plurality of addressing inputs (S_0, S_1, S_2) for receiving present address bits (A_0, A_1, A_2) for identifying the circuit in question;

a data input connectable (L1) to said data signal line;

a clock input (L_2) connectable to said clock signal line;

a shift register ($R_0 \ldots R_7$) connected to said data input and clock input for receiving data sequences and address sequences under synchronization by said clock signal line, said sequence being organized in bit cycles, each bit cycle having at least one sequence;

a memory (M) fed by parallel outputs of said shift register;

a first decoder (CDEC) fed by parallel outputs of said memory for generating decoded binary control signals for controlling user circuits (COM);

wherein said shift register has a downstream end output (QR_8) for forwarding an end-of-sequence acceptance signal (ACN) to a data input of a first control flip-flop (DC1) clocked by said clock signal (SCL) and whose output (Q) synchronizes a second control or pointer flip-flop (PNT), whose inverted output (P) is retrocoupled to its input (D), in which the presence of a logic level "1" at the output (Q) of the first flip-flop (DC1) and at the output (P) of the pointer flip-flop enables an initialization of the shift register, which corresponds to the return of a predetermined initial state;

said circuit furthermore having resetting means for resetting said first and second control flip-flops under the control of an end-of-cycle detection signal (SDA) after said initialization;

wherein said circuit furthermore comprises: a logic comparator (10, 11, 12) for comparing predetermined address bits present in said shift register ($R_0 \ldots R_7$) and said preset address bits presented by said addressing inputs and upon correspondence producing an identification logic signal (DVA);

a storage circuit (66, 67) for storing said identification signal, in the form of a stored identification signal (ADC);

and logical AND gate means enabling the loading into the memory (M) of the data from the shift register when both the outputs of the first control flip-flop (DC_1) and the pointer flip-flop (PNT) are in the logic state "1", and when also said stored identification signal (ADC) is present as well an end-of-sequence acceptance signal (ACN), signalling the end of a data sequence following said address sequence.

4,695,840

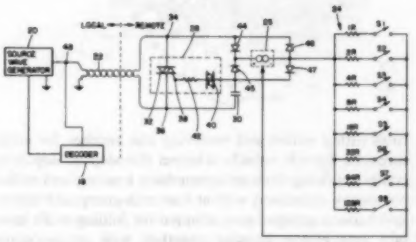
REMOTE SWITCH POSITION DETERMINATION USING DUTY CYCLE MODULATION

Glenn T. Darilek, San Antonio, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 3, 1985, Ser. No. 771,966

Int. Cl.[4] H04Q *9/00*; G08C *19/00*

U.S. Cl. 340—825.054 **34 Claims**



1. A system for determining the position of a plurality of remotely located switches at a local test station comprising:

means for generating a waveform having a predetermined duty cycle at said location test station across a two conductor line connecting said local test station to said remote switches;

uniquely weighted current controlling means connected to each switch for controlling the output of a constant current source connected to said current controlling means;

switching means connected across said two wire line at said remote location for terminating the duty cycle of said generated waveform;

timing means for triggering said switching means in response to the output of said constant current source thereby modulating the duty cycle of said generated waveform to provide a resultant waveform at said local test station having a duty cycle indicative of the position of said remote switches; and

decoding means at said local test station responsive to said resultant waveform for deriving digital output data indicative of the position of each said remote switches.

4,695,841

METHOD FOR DECEIVING ACTIVE ELECTROMAGNETIC DETECTORS AND CORRESPONDING DECOYS

Alain Billard, Muret, France, assignor to Societe E. Lacrois - Tour Artifices, France

Continuation of Ser. No. 454,683, Dec. 30, 1982, abandoned. This application Jan. 21, 1986, Ser. No. 821,502

Claims priority, application France, Dec. 30, 1981, 81 24523

Int. Cl.[4] G01S *7/42*; H01Q *17/00*

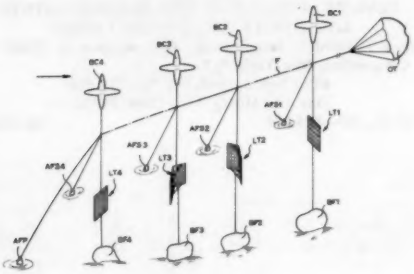
U.S. Cl. 342—8 **3 Claims**

1. A method for deceiving active electromagnetic detectors comprising the step of:

deploying at least one decoy at sea between an altitude between 3 and 20 meters having:

at least one panel with a cellular structure defining a network of contiguous, identical retroreflective trihedrons,

said structure being reversible, the contigous retroreflective trihedrons being arranged head-to-tail and after deployment defined by immediately adjacent rows of cells in alternating head-to-tail relationship wherein the edges of trihedrons comprising one row touch the edges of trihedrons comprising an immediately adjacent row, said rows being anticulated about axes for mutual pivotal movement in such a way that prior to deployment the rows are folded one on to the other with the cells of the adjacent



rows fitting within and receiving one another for enclosure in a launch vehicle wherein the step of deploying comprises firing from an ammunition housing said at least one decoy associated with at least one group of balloons, said balloon groups being adapted for folding to fit inside said ammunition housing together with its associated folded decoy and providing a member for interconnecting said balloons in said group of balloons associated with each of said decoys to keep the interconnected groups in the wind after release, each of said folded balloon groups and respective folded decoys being located adjacent one another in respective cross section sectors within the ammunition housing prior to deployment.

4,695,842

AIRCRAFT RADAR ARRANGEMENT

Franz Jehle, and Holger Meinel, both of Ulm, Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

PCT No. PCT/EP84/00319, § 371 Date Jul. 30, 1985, § 102(e) Date Jul. 30, 1985, PCT Pub. No. WO85/01799, PCT Pub. Date Apr. 25, 1985

PCT Filed Oct. 16, 1984, Ser. No. 748,303

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1983, 3337649

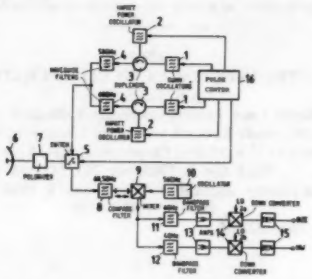
Int. Cl.[4] G01S *13/87*

U.S. Cl. 342—59 **14 Claims**

1. In an aircraft radar arrangement comprising transmitting means and receiving means, a transmit/receive antenna, and a transmit/receive switch for alternatingly connecting the antenna to the transmitting means and receiving means the improvement wherein:

said transmitting means comprises first and second transmitting devices for generating transmitting signals at a first frequency and at a second frequency (f_2), respectively, with the first frequency (f_1) lying in a region of maximum atmospheric attenuation and being used for obstacle warning and the second frequency (f_2) lying in the vicinity of the first frequency and in a region of low atmospheric attenuation and being used for moving target detection, and said first and second transmitting devices being jointly connected with said antenna by said transmit/receive switch; and

said receiving means includes first and second frequency selective devices jointly connected to said antenna by said transmit/receive switch, and first and second receiving channels connected to said first and second frequency selective devices, respectively, said first frequency selective device passing first received signals corresponding to



echoes of the first transmitted signal of frequency (f_1) to said first receiving channel to be processed for obstacle warning, and said second frequency selective device passing second received signals corresponding to echoes of the second transmitted signal of frequency (f_2) to said second receiving channel to be processed, independently and separately of said first received signals, for moving target detection.

4,695,843

METHOD FOR PROCESSING RADIO SIGNALS FOR RADIONAVIGATION AND RECEIVER FOR CARRYING OUT THE SAID METHOD

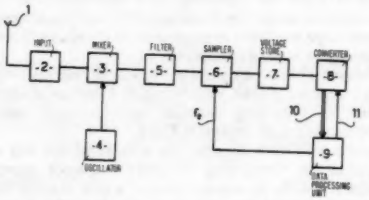
Christian Lamiraux, Saint Sebastien Sur Loire, France, assignor to MLR Electronic, France

Filed May 29, 1984, Ser. No. 614,769

Claims priority, application France, May 30, 1983, 8308916; Apr. 26, 1984, 8406597

Int. Cl.[4] G01S *5/08*

U.S. Cl. 342—417 **17 Claims**



1. A method for processing a series of signals, particularly radiofrequency signals presenting a same interval of low frequency between adjacent ones of said signals, particularly radiofrequency signals of a radionavigation system such as the RANA system, adapted for determining the location of a station or vehicle carrying a radiofrequency processing receiver, by using the phases of the received signals, wherein the received radio signals are converted into a series of signals of lower frequency presenting said same low frequency interval between adjacent ones of said lower frequency signals, in a way that each of said lower frequency signals constitutes a harmonic or a multiple of said interval frequency between two of said adjacent radiofrequency signals, forming a composite signal by superposing said lower frequency signals constituting harmonics of said interval frequency, said composite signal is

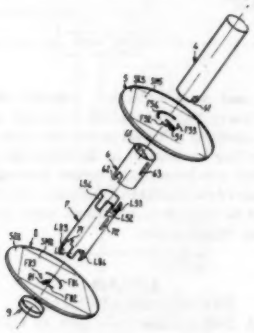
then sampled and a series of signals is locally produced in said receiver which includes the same frequency components as the sampled composite signal, a correlation is established between the frequency components of the sampled signal and of the locally produced frequency components and the values, particularly the phases of said local signals are determined by means of said correlation.

4,695,844

DEVICE FOR RECEIVING DUAL POLARIZED MICROWAVE SIGNALS

Zavoche Houchangnia, Angers, France, assignor to Societe D'Electronique de La Region Pays de Loire, Paris, France

Filed Aug. 30, 1985, Ser. No. 770,951
Claims priority, application France, Aug. 31, 1984, 84 13509
Int. Cl.[4] H01Q *1/38, 19/17*
U.S. Cl. 343—781 CA **12 Claims**



1. Device for receiving a dual polarized microwave signal from an antenna and a depolarization converter electrically coupled to said antenna, said converter coupled to an input of said device and provided to separate the dual polarized microwave signal into two rectilinear polarized components, comprising:

a first waveguide having an input coupled to said converter and an output, said first waveguide having predetermined dimensions and defining a longitudinal axis;

a first sensor comprising a first dielectric substrate and a first metallization formed on said first dielectric substrate, said substrate arranged perpendicular to said longitudinal axis, said first metallization located under said first waveguide adjacent the output of said first waveguide, said first dielectric substrate having at least one slot arranged with a predetermined orientation relative to said first metallization;

a second waveguide defining a longitudinal axis the same as that of said first waveguide and having an input, an output, and internal dimensions the same as that of said first waveguide, said input of said second waveguide arranged adjacent a side of said first dielectric substrate opposite the first waveguide;

a second sensor comprising a second dielectric substrate and a second metallization formed on said second dielectric substrate, said second substrate arranged perpendicular to said longitudinal axis at the output of said second waveguide, said second dielectric substrate having at least one slot arranged with a predetermined orientation relative to said second metallization;

a tube for mechanically coupling said first and second substrates and said second waveguide such that said first and second metallizations provided on said first and second substrates are orthogonal, said tube having an internal dimension equal to the external dimensions of said second waveguide and opposite ends each having at least one protruding tongue, said tube surrounding said second waveguide with said tongues protruding through and mating with the slots of said first and second substrates so that the predetermined orientations of said slots produce orthogonality between said first and second metallizations; and

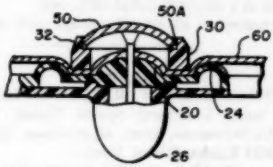
means provided attached to said tube and said second waveguide for decoupling said sensors.

4,695,845

THEFT-DETECTION WAFER ATTACHMENT SYSTEM INCLUDING SHIELD MEMBER

Earl H. Hildt, 2806 Glavin Way, Apt. E, Baltimore, Md. 21234

Filed Oct. 11, 1985, Ser. No. 786,592
Int. Cl.[4] H01Q *1/40*
U.S. Cl. 343—873 **17 Claims**



1. A theft-prevention wafer attachment system, comprising:

a fastener having a head and a shank connected to said head;

a theft detection element having a projection that includes a shank-receiving bore and having a ridge surrounding said projection, and means for releasably engaging a shank inserted into the shank-receiving bore; and

a shield into the shank-receiving bore; and

a shield member having a bore for accepting said head, said projection and having a counterbore for accepting said head, said shield member being proportioned so as to substantially fill the area on said theft detection element between said projection and said ridge, whereby said ridge cannot be used as a fulcrum to pry said fastener away from said theft detection element.

4,695,846

INK-JET RECORDING PROCESS

Eiichi Suzuki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 834,147, Feb. 25, 1986, abandoned, which is a continuation of Ser. No. 585,935, Mar. 5, 1984, abandoned. This application Dec. 3, 1986, Ser. No. 938,343
Claims priority, application Japan, Aug. 3, 1983, 58-37704
Int. Cl.[4] G01D *15/16;* **C09D** *11/00;* **H04N** *1/46;* **G03C** *5/00*
U.S. Cl. 346—1.1 **13 Claims**

1. An ink jet color recording process of impacting ink dots of varying sizes on a recording medium, said ink dots provided by at least one of at least two inks which express a color, each ink comprising at least one dye of the same color, a solvent and a wetting agent, wherein each said ink exhibits a continuous gradient of image density when used individually and a discontinuous gradient when used together, said recording process capable of expressing an image density gradient of color from a lower density to a higher density, said image density gradient characterized by a change in chroma or a change in brightness, wherein said expressed color maintains a substantially constant hue throughout said gradient, which comprises;

(a) toning at least one of said inks by adding a toning dye to

said ink and thereby substantially reducing or eliminating said discontinuous gradient, wherein said toning dye is at

least one of a dye of a different color or a dye of the same color in a different molar ratio; and

(b) recording an ink jet color image with said inks.

4,695,847

METHOD AND APPARATUS FOR RECORDING

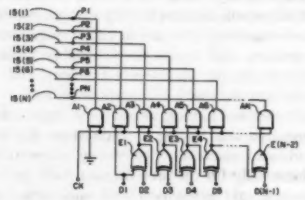
Hiroshi Ishii, Kashihara; Syunzi Nakai, Moriguchi, and Yukihiro Mizumoto, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 20, 1986, Ser. No. 831,346

Claims priority, application Japan, Mar. 5, 1985, 60-43281

Int. Cl.[4] G01D *15/06, 15/10*

U.S. Cl. 346—1.1 **14 Claims**



1. A recording method comprising the steps of

causing a recording sheet to exist between a plurality of electrically conductive needle electrodes and a recording paper, said recording sheet being in contact with said electrodes and having a thermally fusible solid ink layer and a resistive layer, said solid ink layer facing said recording sheet, said needle electrodes being mutually insulated electrically, and

applying a variable potential difference between each of selected pairs of said electrodes for thermal fusion of said solid ink layer and transfer onto said recording paper.

4,695,848

INKJET PRINTING SYSTEM

Marco Padalino, Dallas County, Tex., assignor to Ricoh Co., Ltd., Tokyo, Japan and Ricoh Systems, Inc., San Jose, Calif.

Filed Apr. 21, 1986, Ser. No. 853,918

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—1.1 **21 Claims**

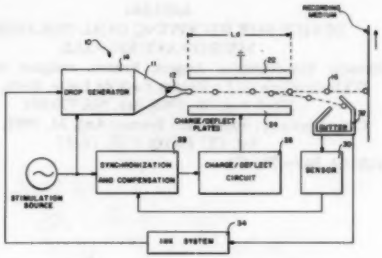
1. An inkjet printing apparatus wherein ink droplets impinge upon a recording medium in a controlled pattern corresponding to information to be recorded, comprising

means for generating an inkjet stream of synchronous droplets toward a recording medium,

a pair of electrodes elongated in the direction of travel of said drops, said electrodes comprising means for selectively charging the drops and for deflecting the drops during a time period each drop passes between the electrodes,

gutter means for capturing drops which are not to appear on said recording medium,

synchronization means coupled to said electrodes for applying a controlled voltage to the plates to allocate each drop's time period between the plates between drop



charging and drop deflection, wherein said electrodes normally carry a voltage which is used to deflect charge drops to continue to travel in the direction of landing on said recording medium or in the direction of said gutter means, said synchronization means altering said voltage on said pair of electrodes to a defined level to apply a level of charge to each drop consistent with landing on said medium or in said gutter.

4,695,849

RECORDING APPARATUS

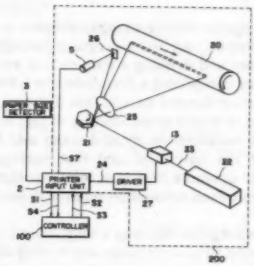
Katsuhito Dei, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 21, 1986, Ser. No. 831,571

Claims priority, application Japan, Feb. 28, 1985, 60-37435; Feb. 28, 1985, 60-37436

Int. Cl.[4] G01D *15/10;* **H04N** *1/21;* **G06F** *3/12;* **B41J** *5/30*

U.S. Cl. 346—76 L **17 Claims**



1. A recording apparatus comprising:

a recording unit for recording an image on the basis of recording data; and

a control unit for sending said recording data to said recording unit;

wherein said control unit comprises output means for outputting a first clock signal for sending said recording data to said recording unit, said recording data being sent to said recording unit in synchronism with said first clock signal, said first clock signal generated by said output means being sent from said control unit to said recording unit, and

wherein said recording unit includes first latch means for latching said recording data sent from said control unit, said first latch means latching said recording data in syn-

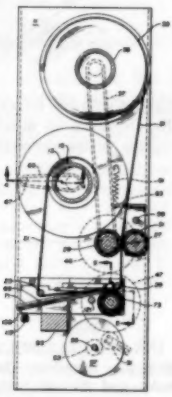
chronism with said clock signal sent from said control unit.

4,695,850

CARD GUIDE APPARATUS FOR USE IN A NON-INPACT PRINTER

Richard C. Nubson, Eden Prairie, Minn., assignor to Data Card Corporation, Minnetonka, Minn.

Filed Aug. 26, 1985, Ser. No. 769,841
Int. Cl.[4] G01D *15/10*; H05B *1/00*; B41J *3/20*
U.S. Cl. 346—76 PH **9 Claims**



1. Thermal transfer printing apparatus for printing on the face of a plastic card, comprising:

a base;

a print roller mounted on the base and rotatable about an axis perpendicular to the base;

card guide means mounted on the base for slidably supporting a card having its face perpendicular to the base and delivered therethrough to a printing station adjacent the surface of the print roller;

a thermal transfer foil sheet supported for movement in contact with the face of the card as it passes through the printing station, the sheet bearing thermally transferrable printing material on the surface thereof;

a capstan roller rotatable about an axis perpendicular to the base;

spring loaded support means upon which the capstan roller is mounted, the spring loaded support means mounted on the base for urging the capstan roller into pressure applying contact with the face of the card beyond the printing station thereby curving a portion of the face of the card to conform to the print roller through the printing station; and

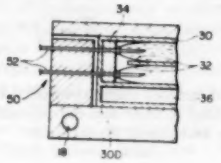
a print head mounted on the spring loaded support means and having at least one row of thermal elements projecting above a planar surface, the row of thermal elements being aligned with the axis of the print roller and arranged for contacting the carrier sheet in the printing station thereby enabling selected thermal elements of the print head when energized, to transfer printing material from portions of the transfer foil to the face of the card.

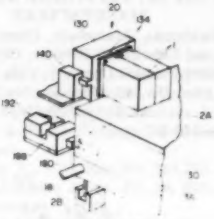
4,695,851

INK JET PRINTER

Koji Terasawa, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1985, Ser. No. 703,484
Claims priority, application Japan, Feb. 24, 1984, 59-34753; Feb. 24, 1984, 59-34754; Feb. 24, 1984, 59-34755; Feb. 24, 1984, 59-34756; Feb. 24, 1984, 59-34757
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **14 Claims**





1. An ink jet printer comprising:

liquid discharge recording means for discharging ink onto the recording surface of a recording medium and effecting recording;

transportation means carrying said liquid discharge recording means and being movable in a predetermined direction relative to said recording surface;

suction means for sucking ink from said liquid discharge recording means through joining means connectable with said liquid discharge recording means when said transportation means is positioned at a predetermined position in which said liquid discharge recording means is not opposed to said recording surface;

waste ink containing means removably mountable on said transportation means; and

discharge means for communicating with said waste ink container means in said predetermined position and discharging into said waste ink container means the ink sucked by said suction means.

4,695,852

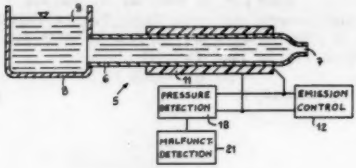
INK JET PRINT HEAD

Alessandro Scardovi, Ivrea, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Oct. 23, 1986, Ser. No. 922,451
Claims priority, application Italy, Oct. 31, 1985, 67918 A/85
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **8 Claims**

1. An ink jet print head comprising an ink reservoir connected to at least one print element having an ink outlet, a piezoelectric transducer which is actuable by a pulse generated selectively by a control circuit for causing the emission of a drop of ink through the outlet, and a circuit for detecting the pressure of the ink in the element during the printing operation, characterised in that said control circuit can be regulated in

such a way as to vary the form and the duration of the pulse in such a way that acoustic reflection waves arising from the pressure wave generated by expulsion of the ink drop are



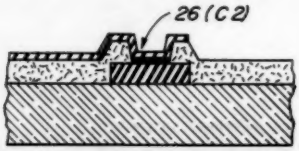
cancelled, and memory means controlled by said control circuit are provided to store data corresponding to the pressure detected after emission of the ink drop.

4,695,853

THIN FILM VERTICAL RESISTOR DEVICES FOR A THERMAL INK JET PRINTHEAD AND METHODS OF MANUFACTURE

David E. Hackleman, Monmouth, Oreg.; James G. Bearss, Boise, Id., and Eldurkar V. Bhaskar, Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 12, 1986, Ser. No. 941,006
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R **9 Claims**



1. A thin film resistor device suitable for use in a thermal ink jet printhead comprising:

a. a substrate member,

b. a conductive patten disposed atop an upper surface of said substrate member,

c. an insulating layer disposed on said conductive pattern and having openings therein aligned with preselected areas on said conductive pattern,

d. a resistive layer of a selected resistivity formed on said preselected areas on said conductive pattern, and

e. a metal barrier layer disposed atop said resistive layer and thereby providing an electrical path for current flowing through said resistive layer and also a shield against ink corrosion and cavitation wear.

4,695,854

EXTERNAL MANIFOLD FOR INK JET ARRAY

Antonio S. Cruz-Uribe, Cobalt, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Jul. 30, 1986, Ser. No. 890,665
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **45 Claims**

1. An impulse ink jet print head of the type including a plurality of operating plates, all lying in parallel planes, held together in a contiguous superposed relationship comprising:

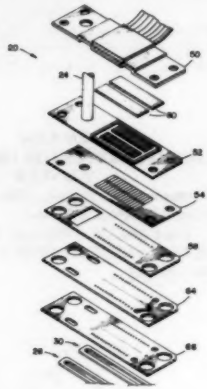
a first plate including a plurality of nozzles therein for ejecting droplets of ink therethrough;

a second plate defining a plurality of ink chambers therein;

an ink supply including compliant manifold means external of said plurality of operating plates;

first passage means connecting each of said chambers to said ink supply;

each of said chambers overlying an associated one of said nozzles and having an outlet for directing ink thereto; and



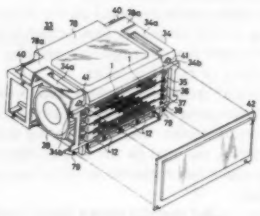
a third plate contiguous with said second plate and including driver means for displacing ink in said chambers thereby causing the ejection of ink droplets from each of said nozzles.

4,695,855

INK JET RECORDER

Hiroo Ichihashi, Hiratsuka; Masakazu Ozawa, Ebina; Ryuichi Ebinuma, Hiratsuka, and Atsushi Saito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1986, Ser. No. 901,739
Claims priority, application Japan, Sep. 4, 1985, 60-193864
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—145 **6 Claims**



1. An ink jet recorder having a head assembly removably mounted on a recorder body, said head assembly having a plurality of head elements each including a plurality of nozzles arranged widthwise of a record sheet, and a removable cover for covering front sides of said head elements, comprising:

a connector for electrical connection with the recorder body removably mounted on said head assembly by a lever; and

a knob mounted on said cover to mechanically engage or disengage said head assembly with or from the recorder body;

said cover being constructed such that it cannot be mounted unless said lever is in a position to disconnect said connector.

4,695,856

SEMICONDUCTOR DEVICE

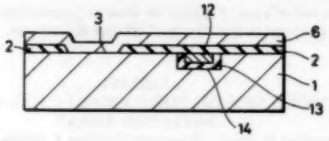
Terunori Warabisako, Nishitama; Makoto Ohkura, Hachioji, both of Japan, and Masanobu Miyao, Amsterdam, Netherlands, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 20, 1984, Ser. No. 642,258

Claims priority, application Japan, Aug. 19, 1983, 58-150149

Int. Cl.[4] H01L *27/12*

U.S. Cl. 357—4 3 Claims



1. A semiconductor device comprising:
a semiconductor substrate;
a first insulating film which is disposed on said semiconductor substrate;
a single crystalline semiconductor film which is continuously disposed on both the surface of said semiconductor substrate and a desired portion of said first insulating film;
a second insulating film which is disposed in a groove provided in said semiconductor substrate; and
a conductive layer which is disposed between said second insulating film and said first insulating film,
wherein said conductive layer and said first and second insulating films are arranged so that said single crystalline semiconductor film will be flat without a stepped portion where it overlies a portion of said first insulating film which overlies said conductive layer and said second insulating film.

4,695,857

SUPERLATTICE SEMICONDUCTOR HAVING HIGH CARRIER DENSITY

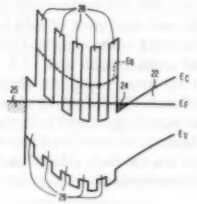
Toshio Baba; Takashi Mizutani, and Masaki Ogawa, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 25, 1984, Ser. No. 624,333

Claims priority, application Japan, Jun. 24, 1983, 58-113801; Jul. 26, 1983, 58-136128; Jul. 26, 1983, 58-136129; Aug. 31, 1983, 58-159813; Aug. 31, 1983, 58-159815; Aug. 31, 1983, 58-159816

Int. Cl.[4] H01L *29/267, 29/205, 29/207*

U.S. Cl. 357—16 6 Claims



1. A superlattice type semiconductor having a multilayered structure of alternately piled first and second layers, said first layers being a semiconductor which is selected from the group of GaAs, InP, Si, Ge, ZnTe and CdTe, and does not involve aluminum, a combination of arsenic and phosphorous, a combination of arsenic and antimony and a combination of silicon and germanium as elements of said semiconductor, each of said first layers having a thickness within a range from 5 Å to 100 Å and doped with P-type impurities, said second layers being a material having a sum of electron affinity and band gap larger than the sum of electron affinity and band gap of said semiconductor selected from a group of ZnSe, CaF_2, ZnS and MgO-Al_2O_3 spinels, and each of said second layers having a thickness within a range from 5 Å to 100 Å.

2. A superlattice type semiconductor having a multilayered structure of alternately piled first and second layers, said first layers being made of GaAs semiconductor having a thickness within a range from 5 Å to 100 Å, wherein said semiconductor does not involve aluminum, a combination of arsenic and phosphorous, a combination of arsenic and antimony and a combination of silicon and germanium as elements of said semiconductor, each of said first layers having an N-type impurity doped region sandwiched by impurity-free regions, said impurity-free regions contacting said second layers, said second layers being made of AlAs which produces lattice defect by contacting with said impurities and has an electron affinity smaller than said GaAs semiconductor, said second layers having a thickness within a range from 5 Å to 100 Å.

4,695,858

DUPLEX OPTICAL COMMUNICATION MODULE UNIT

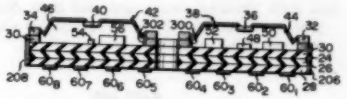
Hatsuo Takezawa, Yokohama; Kenichi Donuma, Koshigaya; Shuhei Katagiri, Tokyo, and Shigeyuki Sakura, Yokohama, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 15, 1983, Ser. No. 514,250

Claims priority, application Japan, Jul. 19, 1982, 57-124424; Jun. 20, 1983, 58-109345

Int. Cl.[4] H01L *31/12*

U.S. Cl. 357—19 19 Claims



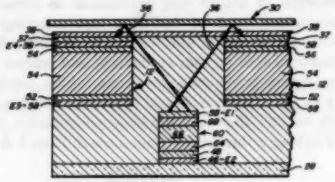
1. A duplex optical communication module unit comprising:
a first ceramic substrate having first and second major surfaces, first conductor layers being formed on said first major surface;
a first shell of metal, having a first transparent window member, heremetically sealed to said first major surface of said first ceramic substrate and defining a first space with said first major surface of said first ceramic substrate;
a second shell of metal, having a second transparent window member, heremetically sealed to said first major surface of said first ceramic substrate and defining a second space with said first major surface of said first ceramic substrate;
a first metallization layer formed on said first major surface of said first ceramic substrate substantially over the entire area in said first space except for insulating areas surrounding said first conductor layers;
a light-receiving element formed on said first major surface of said first ceramic substrate in said first space in opposition to said first transparent window member;
a circuit element formed on said first major surface of said first ceramic substrate in said first space, for amplifying the output current of said light-receiving element, said circuit element having an AC-grounded terminal;
a light-emitting element formed on said first major surface of said first ceramic substrate in said second space in opposition to said second transparent window member; and
a lead terminal connected to said AC-grounded terminal of said circuit element.

4,695,859

THIN FILM LIGHT EMITTING DIODE, PHOTONIC CIRCUIT EMPLOYING SAID DIODE AND IMAGER EMPLOYING SAID CIRCUITS

Subhendu Guha, Troy, and Satish Agarwal, Clawson, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Oct. 20, 1986, Ser. No. 921,030
Int. Cl.[4] H01L *31/12, 31/16*
U.S. Cl. 357—19 **47 Claims**



1. A solid state, integrated photonic structure comprising:

a substrate;

means for emitting light in response to an applied electrical stimulus, said light emitting means formed of a plurality of layers of thin film semiconductor alloy material deposited on said substrate;

means for detecting light emanating from the emitting means, said light detecting means formed of a plurality of layers of thin film semiconductor alloy material also deposited on said substrate;

said light detecting means (1) disposed in sufficient proximity to and (2) including a photogenerative layer having a band gap tailored so as to generate a detectible signal in response to light emanating from said light emitting means; and

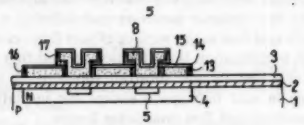
said light emitting means and said light detecting means electrically isolated from one another by a layer of deposited insulating material.

4,695,860

GATE STRUCTURE FOR AN INTEGRATED CIRCUIT COMPRISING ELEMENTS OF THE GATE-INSULATOR-SEMICONDUCTOR TYPE AND A METHOD OF FABRICATION OF AN INTEGRATED CIRCUIT USING SAID STRUCTURE

Pierre Blanchard, Vierrieres-le-Buisson; Pierrick Descure, Biviers, and Jacques Chautemps, St. Egreve, all of France, assignors to Thomson-CSF, Paris, France

Filed Sep. 12, 1983, Ser. No. 531,440
Claims priority, application France, Sep. 21, 1982, 82 15905
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—24 LR **6 Claims**



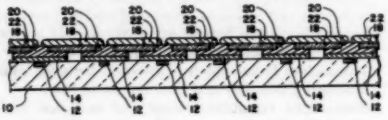
1. A photosensitive charge-transfer device comprising photosensitive transfer elements of the gate-insulator-semiconductor type which are positioned on first and second overlapping levels comprising a semiconductive substrate over which lies a gate insulating layer, a plurality of first level gates spaced apart along the substrate and insulated therefrom by the gate insulating layer, each first level gate comprising a first layer of doped polycrystalline silicon, the top surface of which is covered with a first layer of a compatible insulating material having a refractive index higher than 1.5 and the side surfaces of which are covered with a first layer of silicon oxide, the silicon oxide layer being positioned under the edge portions of the first layer of compatible insulating material, a plurality of second level gates spaced apart along the substrate and interleaved with the plurality of first level gates, each second level gate comprising a second layer of doped polycrystalline silicon, the top surface of which is covered with a second layer of a compatible insulating material having a refractive index higher than 1.5, each second level gate interleaved between two first level gates including symmetric edge portions overlapping said two interleaved first level gates for charge transfer between adjacent gates, and a layer of insulating material separating the overlapping portions of the first and second level gates.

4,695,861

BACKSIDE MOSAIC PHOTOCONDUCTIVE INFRARED DETECTOR ARRAY

Christopher G. Paine, Worcester; William J. White, Chelmsford, both of Mass., and Susan J. Resnick, Great Neck, N.Y., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 770,893, Oct. 21, 1985, abandoned.
This application Feb. 9, 1987, Ser. No. 13,186
Int. Cl.[4] H01L *27/14*
U.S. Cl. 357—30 **12 Claims**



5. A backside contacted photoconductive detector apparatus, said apparatus comprising:

A. a first substrate made of a detector material;

B. a second substrate;

C. said second substrate including a plurality of first contact pads fastened to one surface of said second substrate, and wherein said first contact pads are positioned to avoid electrical contact between each of said first contact pads;

D. a plurality of insulating passivations on a first surface of said first substrate, said passivations shaped to expose portions of said first substrate;

E. a plurality of second contact pads on said first substrate, each of said second contact pads having first and second surfaces and each of said second contact pads is positioned between two of said passivations so that edges of said first surfaces overlap respective edges of said passivations and a portion of said first surface between said passivations is in electrical contact with the first substrate;

F. wherein said first and said second substrates are in physical contact such that each of said first contact pads is in electrical contact with respective said second surfaces of said second contact pads; and

G. said first substrate being cut through so as to form a plurality of individual detectors, each of which overlies one of said passivations, and such that each of said detectors is in electrical contact with two of said second contact pads which are on each side of each of said plurality of insulating passivations.

4,695,862

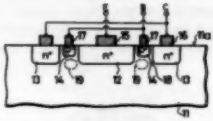
SEMICONDUCTOR APPARATUS

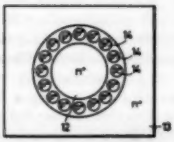
Yoji Kato, Kanagawa; Seiichi Watanabe, Tokyo, and Masaru Wada, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,537
Claims priority, application Japan, Sep. 20, 1984, 59-197304
Int. Cl.[4] H01L *29/72, 29/80*
U.S. Cl. 357—36 **6 Claims**

1. A semiconductor apparatus comprising, a semi-insulating semiconductor substrate, a disc-shaped emitter region of a first

conductivity type formed in said semiconductor substrate, a collector region of a first conductivity type formed in said semiconductor substrate and spaced from said emitter region, and formed with a round central opening in which said disc-shaped emitter region is symmetrically mounted, a plurality of third regions of a second conductivity type formed in said semiconductor substrate in said central opening between said collector and said disc-shaped emitter regions and arranged in





a circular shape, first voltage biasing means for forward biasing said emitter region relative to said plurality of third regions, and second voltage biasing means for reverse biasing said collector region relative to said plurality of third regions, to form imaginary base regions in said semi-insulating substrate beneath said plurality of third regions by majority carrier implantation from said plurality of third regions so that said semiconductor apparatus operates as a bipolar transistor.

4,695,863

GATELESS PROTECTION THYRISTOR WITH A THICK, HEAVILY DOPED CENTRAL N-LAYER

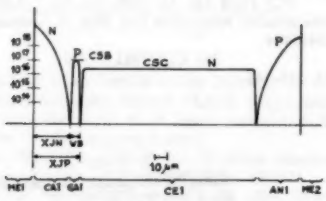
Jean P. Noguier, St. Cyr sur Loir, and Jean P. Montaut, Tours, both of France, assignors to Thomson CSF, Paris, France

Filed Mar. 12, 1986, Ser. No. 838,934

Claims priority, application France, Mar. 12, 1985, 85 03626

Int. Cl.[4] H01L *29/74*

U.S. Cl. 357—38 **3 Claims**



1. A thyristor of the type without a gate electrode, comprising:

a semiconductor substrate, which includes the superimposition of a plurality of layers which includes (a) a heavily doped P type anode layer, (b) a slightly doped N type central layer, (c) a moderately doped P type gate layer and (d) a heavily doped N type cathode layer;

wherein: the gate region has a thickness less than 10 microns between the cathode layer and the central layer and an impurity concentration between 5×10^{16} atoms/cm^3 and 5×10^{18} atoms/cm^3, and the central layer has a thickness greater than 100 microns and an impurity concentration of at least 10^{16} atoms/cm^3.

4,695,864

DYNAMIC STORAGE DEVICE WITH EXTENDED INFORMATION HOLDING TIME

Hiroshi Kawamoto, Kodaira, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

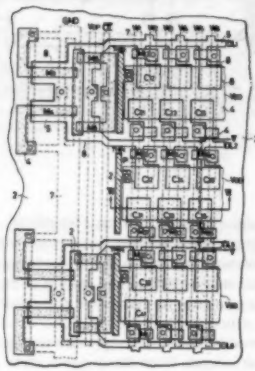
Division of Ser. No. 154,826, May 30, 1980, which is a continuation of Ser. No. 851,692, Nov. 15, 1977, abandoned. This application Apr. 26, 1983, Ser. No. 488,644

Claims priority, application Japan, Nov. 19, 1976, 51-138341

The portion of the term of this patent subsequent to Jan. 1, 2002, has been disclaimed.

Int. Cl.[4] H01L *27/02, 29/78, 29/04;* G11C *11/24*

U.S. Cl. 357—41 **17 Claims**



1.

A semiconductor memory circuit device comprising:

a memory cell array formed at a predetermined area in a main surface of a semiconductor substrate, said memory cell array including a plurality of word lines arranged in parallel with each other in columns, a plurality of data lines arranged in parallel with each other in rows, and a plurality of 1-element type memory cells arrayed in rows and columns, each said memory cell comprising a capacitor which is made up of a semiconductor portion of said main surface of the semiconductor substrate serving as its one electrode and a conductive layer serving as its other electrode and formed on an insulating film formed over said portion of said semiconductor substrate and an insulated gate field-effect transistor electrically connected in series with said capacitor and having its gate electrode connected to one of said word lines, the series connection of said capacitor and insulated gate field-effect transistor being coupled to one of said data lines; and

at least one semiconductor region having a conductivity type opposite to the conductivity type of said semiconductor substrate, extending substantially along and adjacently to said semiconductor portions of said capacitors of the memory cells arrayed at the most outside row or column of said memory cell array, and formed outside said predetermined area in said main surface of the semiconductor substrate along an edge of said predetermined area which is not opposite transistors in peripheral circuits of said semiconductor memory circuit, but not formed between said adjacent semiconductor portions of the capacitors arrayed at the adjacent rows or columns.

4,695,865

INTEGRATED LOGIC CIRCUIT HAVING INSULATED GATE FIELD EFFECT TRANSISTORS

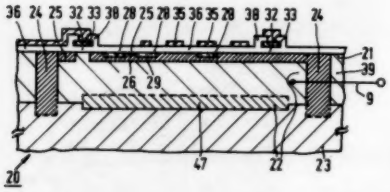
Kornelis J. Wagenaar, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 4, 1985, Ser. No. 719,950

Claims priority, application Netherlands, Apr. 9, 1984, 8401117

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—41 12 Claims



1. A semiconductor device comprising a semiconductor body having a plural transistor structure, a major surface and a first semiconductor region of a first conductivity type which adjoins said major surface and which comprises a first electrode zone common to said plural transistor structure, which transistor structure comprises a second semiconductor zone of a second conductivity type opposite to the first conductivity type which extends from the major surface into the semiconductor body down to a smaller depth than that of the first semiconductor region, the second semiconductor zone forming with the first semiconductor region a first pn junction which terminates at the major surface while forming at this major surface a first outer ede of the second semiconductor zone, third surface zones of the first conductivity type, plural second electrode zones associated with the transistor structures and formed by said third surface zones of the first conductivity type, located within the second semiconductor zone and separated by second pn junction from the second semiconductor zone, said second pn junctions terminating at the major surface while forming at said surface a second outer edge of each of the third surface zones, channel regions between each of the third surface zones and the common first electrode zone, an insulating layer adjoining said channel regions, and a first conductive layer serving as an insulated gate, each of the channel regions being separated by the insulating layer from said first conductive layer, a second conductive layer, said third surface zones being provided at the major surface with an electrical connection formed by said second conductive layer, the second semiconductor zone in at least a first of the transistor structures being common to two or more third surface zones and the electrical connection of these third surface zones being separated from each other and forming signal outputs, the first transistor structure having a common signal input associated with said signal outputs, characterized in that the channel regions of the transistor structures are located at the major surface between the first and second outer edges, the second semiconductor zone of the first transistor structure is connected to the second semiconductor zone of at least one of the remaining transistor structures, and the signal inputs comprise the insulated gates of the transistor structures, the insulated gates having at least a strip-shaped part and one or more third surface zones being arranged along a long side of the strip-shaped part.

4,695,866

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

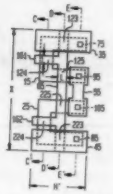
Kunihiro Koyabu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 28, 1984, Ser. No. 655,718

Claims priority, application Japan, Sep. 28, 1983, 58-179601

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—42 3 Claims



1. A semiconductor integrated circuit device comprising a semiconductor substrate, a transistor forming region provided in a major surface of one conductivity type region of said semiconductor substrate and including a first rectilinear portion extending in one direction and second and third rectilinear portions connected to the opposite ends of said first rectilinear portion and extending in parallel to each other and in a direction at right angles to said one direction, a single gate electrode including a main portion extending in said one direction and crossing over channel forming locations of said second and third rectilinear portions, respectively and a branch portion connected to a part of said main portion extending in the direction at a right angle to said one direction to cross over a channel forming location of said first rectilinear portion, and source and drain regions of the opposite conductivity type provided in the locations other than said channel forming locations of said transistor forming region.

4,695,867

MONOLITHICALLY INTEGRATED PLANAR SEMICONDUCTOR ARRANGEMENT

Peter Flohrs, and Hartmut Michel, both of Reutlingen, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

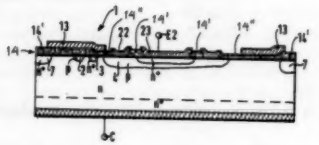
PCT No. PCT/DE85/00118, § 371 Date Aug. 21, 1985, § 102(e) Date Aug. 21, 1985, PCT Pub. No. WO85/05497, PCT Pub. Date Dec. 5, 1985

PCT Filed Apr. 16, 1985, Ser. No. 775,044

Claims priority, application Fed. Rep. of Germany, May 11, 1984, 3417474

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—46 3 Claims



1. Monolithically integrated planar semiconductor arrangement comprising a substrate of a type of conductivity; at least one zone of an opposite type of conductivity being diffused into the substrate to form a p-n junction; a resistor strip of the same type of conductivity as said zone being diffused into said substrate at a distance from the periphery of said p-n junction, said resistor strip having a tap to form a voltage divider; a highly doped outer guard ring of the same type of conductivity as the substrate being diffused into said substrate to delimit the

semiconductor arrangement; a highly doped guard strip of the same type of conductivity as said outer guard ring being diffused into the substrate between said resistor strip and said p-n junction and being connected at one end thereof with the outer guard ring; a passivation layer provided on the substrate; a cover electrode provided on the passivation layer over space-charged areas generated during reversed bias mode of operation, said cover electrode being connected with said tap of the resistor strip; and said passivation layer beneath said cover electrode being thinner in the regions between said p-n junction and said guard strip and between said p-n junction and a facing part of said outer guard ring than in the remaining area beneath the cover electrode.

4,695,868

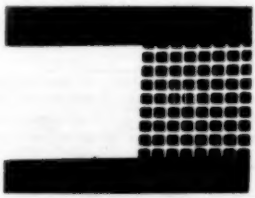
PATTERNED METALLIZATION FOR INTEGRATED CIRCUITS

Albert W. Fisher, East Amwell Township, Hunterdon County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Dec. 13, 1985, Ser. No. 808,531

Int. Cl.[4] H01L *23/52, 23/54*

U.S. Cl. 357—68 **4 Claims**



1. In a structure comprising a semiconductor substrate having thereon an area of metallization at least about 10 micrometers in its smallest dimension other than thickness and a layer of dielectric material overlying said area of metallization, said dielectric material and metallization having substantially differing thermal coefficients of expansion, the improvement wherein said area is replaced with an interconnected patterned area of metallization having about the same conductivity, such that there is substantial direct contact between the substrate and the dielectric material through openings in said patterned area, said openings being at least about three micrometers in their smallest dimension and the metal land between said openings being not greater than about ten micrometers.

4,695,869

GAAS SEMICONDUCTOR DEVICE

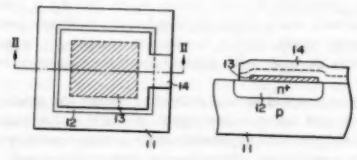
Kazuhiko Inoue, Kawasaki; Tatsuro Mitani, Tokyo, and Yoshihiro Kishita, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 613,186, May 23, 1984, abandoned. This application Jul. 7, 1986, Ser. No. 883,011

Claims priority, application Japan, May 31, 1983, 58-94859

Int. Cl.[4] H01L *23/48, 23/54*

U.S. Cl. 357—71 **14 Claims**



1. A GaAs semiconductor device comprising:

a GaAs substrate;

a plurality of ohmic contact electrodes formed on said substrate and each including a layer of alloy of gold; and

a plurality of conductive members respectively formed on said ohmic contact electrodes and each including an upper layer of aluminum and a lower layer of a metal capable of preventing gold from passing therethrough, said lower layer being formed to cover completely the top and side surfaces of a corresponding one of said ohmic contact electrodes.

4,695,870

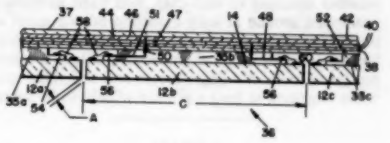
INVERTED CHIP CARRIER

Nils E. Patraw, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 27, 1986, Ser. No. 811,207

Int. Cl.[4] H01L *23/02*

U.S. Cl. 357—74 **22 Claims**



1. A microelectronic chip interface apparatus for electrically coupling to circuit interface means provided upon a microelectronic chip, said apparatus comprising:

a mesa portion having a plurality of mesa interface means, said mesa portion being mounted upon a top surface of the chip,

at least one ledge portion extending outwardly from said mesa portion, said ledge portion having a plurality of ledge interface means,

said ledge interface means being electrically coupled to a plurality of coupling wires, each of said wires further being coupled to a corresponding circuit interface means,

a plurality of carrier internal conductors, said carrier internal conductors being selectively electrically coupled to said plurality of mesa interface means, and

said carrier internal conductors also being selectively electrically coupled to said plurality of ledge interface means whereby each of said circuit interface means is electrically coupled to one of said mesa interface means.

4,695,871

LIGHT-TRIGGERED SEMICONDUCTOR DEVICE

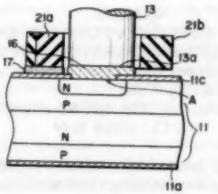
Yoshiaki Tsunoda, and Hideo Matsuda, both of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan

Filed Aug. 26, 1983, Ser. No. 526,807

Claims priority, application Japan, Aug. 31, 1982, 57-149995; Dec. 28, 1982, 57-230688

Int. Cl.[4] H01L *23/02, 23/12*

U.S. Cl. 357—74 **3 Claims**



1. A light-triggered thyristor which comprises:

at least one light-triggered semiconductor chip having a light-sensitive area;

means for providing an airtight enclosure for said at least one light-triggered semiconductor chip;

transparent means proximate the periphery of said air-tight enclosure means for receiving light, said transparent means positioned outside an area directly above said light-sensitive area;

guide means for projecting light within said airtight enclosure means an onto said light-sensitive area, said guide means having a first end connected to said transparent means, a second end connected adjacent to said light-sensitive area and an intermediate portion between said first and second ends, wherein said second end includes an elastic transparent material fitted thereon and wherein said said second end has a larger transverse section than said light-sensitive area; and

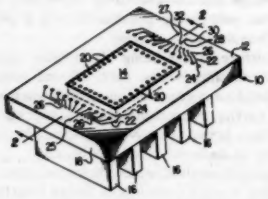
a light guide-locating assembly for locating said transverse section to project light therefrom substantially uniformly onto all of said light sensitive area and having a fixed member attached to said chip, said fixed member being positioned around at least a portion of said guide means proximate said second end, said locating assembly also having a flexible member enveloping at least a substantial portion of both said guide means and said fixed member, while engaging at least a portion of said fixed member.

4,695,872

HIGH DENSITY MICROPACKAGE FOR IC CHIPS

Pallab K. Chatterjee, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 1, 1986, Ser. No. 892,224
Int. Cl.[4] H01L *23/16*
U.S. Cl. 357—75 **19 Claims**



1. High density packaging apparatus for mounting a plurality of integrated circuit chips thereto, comprising:

a chipmount having a plurality of channels on one face thereof for holding a corresponding plurality of integrated circuit chips, and a cavity on another face of said chipmount for holding an integrated circuit chip; and

a plurality of interconnections for electrically connecting the plurality of integrated circuit chips mounted on said one face to one another, and for electrically connecting the plurality of integrated circuit chips on said one face with the integrated circuit chip mounted on said another face.

4,695,873

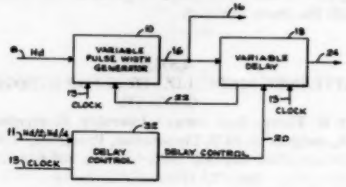
HORIZONTAL LINE DATA POSITION AND BURST PHASE ENCODING APPARATUS AND METHOD

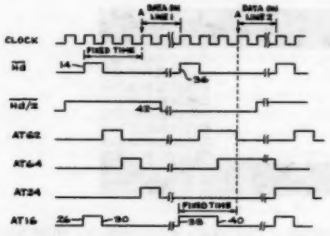
Terrance Smith, Redwood City, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Jun. 10, 1986, Ser. No. 872,568
Int. Cl.[4] H04N *9/44*
U.S. Cl. 358—13 **19 Claims**

1. In a system for processing a digitally encoded composite color television signal comprising a horizontal line synchronizing signal and a color burst signal having predetermined phase relationships to said horizontal line synchronizing signal which differ on consecutive horizontal lines of said color television signal, apparatus for encoding information related to a beginning of data pertaining to each horizontal line and to a phase of said color burst signal on consecutive lines of said digitally encoded signal, said apparatus comprising:

variable width pulse forming means, coupled to receive a first synchronizing signal having a predetermined phase relationship with said horizontal line synchronizing signal and a frequency corresponding thereto, for providing a variable width output pulse having a first transition of a predetermined phase relationship with said first signal;





delay control means, coupled to receive a signal indicating said predetermined phase relationship of said color burst signal at a beginning of each horizontal line, for providing respective delay control signals for respective values of said phase relationship; and

variable delay means coupled to receive said delay control signals, for applying responsively a delayed control signal to a control input of said variable width pulse forming means, said variable width pulse forming means coupled to provide a second transition of said variable width output pulse in response to said delayed control signal.

4,695,874

APPARATUS FOR PROCESSING A TIME-DIVISION MULTIPLEX VIDEO SIGNAL HAVING SIGNAL DURATIONS DIVISIBLE BY THE SAME NUMBER

Steven J. Sasson, Springwater, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 1, 1985, Ser. No. 793,820
Int. Cl.[4] H04N *9/64*
U.S. Cl. 358—21 R **7 Claims**

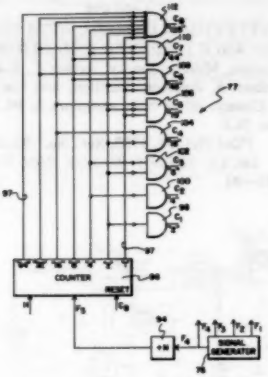
4. Time-division-multiplex (TDM) video signal apparatus comprising:

means for providing a color video signal having a sync signal portion, and a video portion having a chrominance component signal, and a luminance component signal concurrent in time with said chrominance component signal;

circuit means coupled to said providing means for producing, from said color video signal, a TDM color video signal having in time sequential order, a compressed sync signal, a compressed chrominance component signal, a first buffer and a compressed luminance component signal wherein each of said compressed chrominance and lumi-

nance component signals constitute a series of time-compressed samples of equal sample duration; and

control means for controlling said circuit means so that the durations of said compressed sync signal, said compressed chrominance component signal, said buffer and said compressed luminance component signal respectively of said TDM color video signal are equal to an integral multiple of said sample duration and each such TDM signal duration is divisible by the same integral number greater than one.



4,695,875

AUTOMATIC HUE CORRECTION CIRCUIT

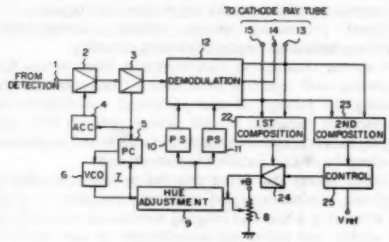
Hiroyasu Kishi, Gunma, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 3, 1986, Ser. No. 835,844

Claims priority, application Japan, Mar. 14, 1985, 60-50867; Mar. 14, 1985, 60-50868; Mar. 14, 1985, 60-50869; Aug. 10, 1985, 60-176551; Aug. 20, 1985, 60-182422

Int. Cl.[4] H04N 9/64

U.S. Cl. 358—28 **8 Claims**



1. An automatic hue correction circuit in a color television receiver, comprising;

demodulation means for demodulating three color difference signals from a chroma signal which is separated from a received composite video signal,

first composition means for composing a Q signal by using the demodulated color difference signals,

second composition means for composing an I signal by suing the demodulated color difference signals,

amplification means for producing an adjustment signal which is formed from the Q signal derived from the first composition means,

hue correction means for supplying to the demodulation means a subcarrier signal for rotating demodulation axes in the demodulation means so that a level of the Q signal becomes smaller in accordance with the adjustment signal derived from the amplification means, and

control means for making the amplification means active when a level of the I signal derived from the second composition means exceeds a reference level.

4,695,876

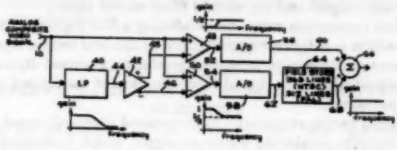
METHOD AND APPARATUS FOR THE EXTRACTION OF LUMINANCE INFORMATION FROM A VIDEO SIGNAL USING A FIELD STORE

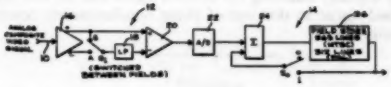
Daniel A. Beaulier, Menlo Park, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Continuation of Ser. No. 482,118, Apr. 4, 1983, abandoned. This application Jul. 15, 1986, Ser. No. 885,992

Int. Cl.[4] H04N 9/78

U.S. Cl. 358—31 **13 Claims**





1. Apparatus for extracting luminance information from a video signal composed of first and second fields of a plurality of frequency components wherein a plurality of high frequency components, containing non-luminance information, are out of phase by 180° from the first to the second fields, the apparatus comprising:

first filter means responsive to the video signal of the first field for analogly producing a filtered first field signal comprised of those signals having frequency components below the selected frequency increased in amplitude by twice a constant gain and those signals having frequency components above the selected frequency increased in amplitude by the constant gain;

second filter means responsive to the video signal of the second field for analogly producing a filtered second field signal comprised of those signals having frequency components below the selected frequency decreased in amplitude to zero and those signals having frequency components above the selected frequency increased in amplitude by the constant gain;

analog-to-digital conversion means responsive to the filtered first field signal for producing a digitized first field signal that is a digital representation of the filtered first signal, and responsive to the filtered second field signal for producing a digitized second field signal that is the digital representation of the filtered second field signal;

delay means responsive to the digitized first field signal for digitally producing a delayed first field signal that is the digitized first field signal delayed by a period of a field; and

summing means responsive to the delayed first field signal and the digitized second field signal for extracting the luminance information by digitally summing the delayed first field signal and the digitized second field signal so that out of phase non-luminance components cancel.

6. Apparatus for extracting luminance information from a

video signal composed of successive fields of a plurality of frequency components wherein a plurality of high frequency components, containing non-luminance information, are out of phase by 180° from field to successive field, the apparatus comprising:

filtering means responsive to the video signal for analogly producing a first and second filter output signal so that the first filter output signal contains the low frequency components present in the video signal and the second filter output signal contains the low frequency components present in the video signal shifted in phase by 180°;

a first summing means responsive to the video signal and the first filter output signal for analogly producing a first output signal equal to the difference between the video signal and the first filter output signal;

a second summing means responsive to the video signal and the second filter output signal for analogly producing a second output signal equal to the difference between the video signal and the second filter output signal;

a first conversion means for producing a first digitized signal which is a digital representation of the first output signal;

a second conversion means for producing a second digitized signal which is a digital representation of the second output signal;

a delay means responsive to the second digitized signal for digitally producing a delayed signal which is delayed by the period of a field; and

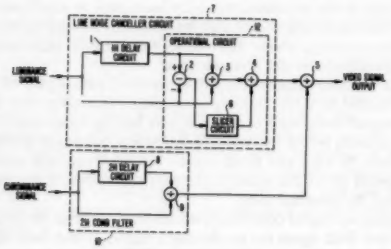
summing means responsive to the delayed signal and the first digitized signal for extracting the luminance information by digitally summing the delayed signal and the first digitized signal so that out of phase non-luminance components cancel.

4,695,877

VIDEO SIGNAL PROCESSING APPARATUS FOR COMPENSATING FOR TIME DIFFERENCES BETWEEN LUMINANCE AND CHROMINANCE SIGNALS OF A PAL SYSTEM

Tokikazu Matsumoto, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 12, 1985, Ser. No. 797,034
Claims priority, application Japan, Dec. 5, 1984, 59-256701
Int. Cl.[4] H04N *5/21*
U.S. Cl. 358—36 **3 Claims**



1. A video signal processing apparatus for compensating for time differences between luminance and chrominance signals of a PAL system comprising:

a 1H delay means for delaying a luminance signal of the PAL system by one horizontal synchronizing period;

an operational means for allowing an output signal of said delay means to pass therethrough when a difference between levels of said luminance signal and said output signal of said delay means is larger than a predetermined value, and for outputting a sum of said luminance signal and said output signal of said delay means when said difference is smaller than said predetermined value;

a 2H comb filter for passing a chrominance signal of the PAL system; and

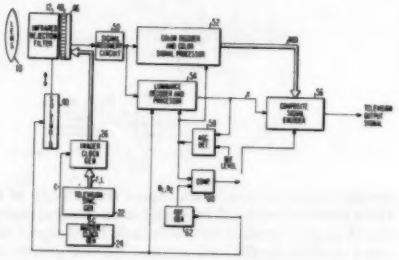
an adder means for adding an output signal of said operational means and an output signal of said 2H comb filter so as to thereby obtain a video signal.

4,695,878

COLOR TELEVISION CAMERA WITH SELECTIVELY REMOVABLE INFRARED REJECTION FILTER

Peter A. Levine, Mercer County; Arthur L. Cobb, Jr., Cherry Hill; Cydney A. Johnson, Marlton, and Gary R. Peterson, Camden County, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Oct. 31, 1985, Ser. No. 793,234
Int. Cl.[4] H04N *9/07, 5/33, 9/04, 9/67*
U.S. Cl. 358—44 **13 Claims**



1. A color television camera, comprising:

imaging means responsive to incident radiation of visible wavelengths as well as additional wavelengths for developing an image-representative output signal in response to said incident radiation;

optical means for directing said incident radiation to said imaging means along an optical path;

rejection filter means for substantially blocking the passage of said additional wavelengths of said incident radiation in said optical path so that said imaging means normally responds to only said visible wavelengths of said incident radiation;

signal processing means responsive to said image-representative output signal for producing a television signal;

said signal processing means including controllable weighting luminance signal matrixing circuitry;

control means coupled to said rejection filter means for preventing said rejection filter means from substantially blocking the passage of said additional wavelengths of said incident radiation in said optical path so that said imaging means responds to both said visible and additional wavelengths of said incident radiation; and

said control means also being coupled to said controllable weighting luminance signal matrixing circuitry to alter said weighting when said imaging means responds to both said visible and additional wavelengths of said incident radiation.

4,695,879

TELEVISION VIEWER METER

Lee S. Weinblatt, 797 Winthrop Rd., Teaneck, N.J. 07666

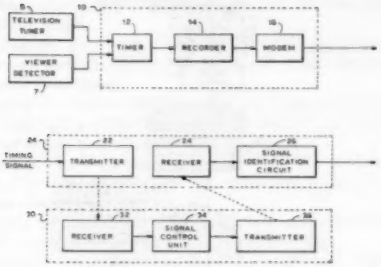
Filed Feb. 7, 1986, Ser. No. 827,760
Int. Cl.[4] H04H *9/00;* **H04N** *17/00*
U.S. Cl. 358—84 **8 Claims**

1. Apparatus for determining the television viewing habits of at least one selected individual, which apparatus is usable with recording means coupled to a tuner of a television set for storing a television channel to which said tuner is tuned, said apparatus comprising:

a stationary monitoring unit adapted to be placed in close

proximity to said television set, said unit including first transmitter means for regularly emitting an activation signal, a first receiver means, and a signal identification means coupled to the output of said first receiver means; and

a portable monitoring unit adapted to be worn on the heat of said by least one selected individual and including a second receiver coupled to a signal control means, said second receiver means being responsive to said activation signal only when the individual wearing it is looking in the direction of the television set and including means aimed



to point in substantially the same direction in which said head is pointed, said signal control means being responsive only to said activation signal to generate a control signal, and a second transmitter means responsive to said control signal for emitting an identification signal unique to the at least one selected individual wearing said portable monitoring unit; and

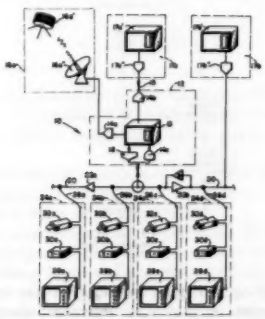
said signal identification means of the stationary monitoring unit recognizes said identification signal and generates a viewer signal to be stored on said recording means in association with the corresponding recorded television channel.

4,695,880

ELECTRONIC INFORMATION DISSEMINATION SYSTEM

Terry W. Johnson, Birmingham; Daryl E. Harms, Mountain Brook, and Ricky L. Curl, Pinson, all of Ala., assignors to Postron Corp., Birmingham, Ala.

Filed Jul. 30, 1985, Ser. No. 760,491
Int. Cl.[4] H04H *1/04;* H04N *7/10*
U.S. Cl. 358—86 **16 Claims**



8. In an information dissemination system of the type for transmitting data signals over distances from a central data handling station to a plurality of remote stations via an existing communication medium, wherein the data signals include both a global message under a global code common to all of the remote stations and individual messages under distinct codes that are each unique to particular remote station, the remote stations each having apparatus for receiving and printing the messages contained in the data signals, the apparatus comprising:

receiver means for receiving the data signals including the global message and the individual messages;

selection means operatively connected with the receiver means for identifying and storing the global message under the global code and an individual message under the distinct code for the particular remote station;

data combining means for combining the individual message with the global message and generating print signals for reproducing the combined global and individual messages;

and

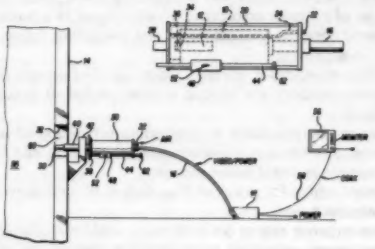
printing means responsive to the print signals for printing the combined global and individual messages selected by the selection means.

4,695,881

APPARATUS FOR IMAGING INFRARED EMITTING SURFACES

Jesse R. Kennedy, 5217 S. Marietta Dr., and Marcus R. Kennedy, Rte. 3, Box 94, both of Mobile, Ala. 36618

Filed Dec. 16, 1985, Ser. No. 809,329
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—100 **9 Claims**



1. An imaging apparatus comprising

a television camera assembly and extension lens assembly for televising an interior of an apertured chamber;

a tubular member mounted in a wall of the chamber and aligned with the aperture;

a plurality of guide rods constructed integral with and having axes disposed parallel to the tubular member;

bearings attached to a camera housing in the television camera assembly;

the bearings having openings concentric with and slidably mounted on the guide rods;

a fixed stop which limits the forward movement of the bearings on the guide rods;

an image detection means cooperating with the television camera assembly sensitive in the infrared region for sensing an infrared image of emitting surfaces within the apertured chamber;

lens means for projecting and focusing the infrared image of the emitting surfaces on the image detection means;

optical filter means placed in cooperation with the lens means limiting the spectral sensitivity of the imaging apparatus including an edge filter limiting the spectral sensitivity of the imaging apparatus to wavelengths upward of 0.7 micrometers;

display means responsive to the image detection means for producing a visual image of the emitting surfaces being observed;

the optical filter means further including a neutral density

optical filter for improving the clarity of an image produced and for prolonging life of the image detection means, and

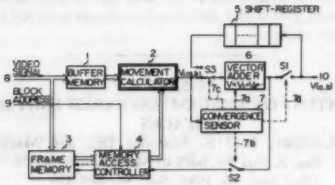
controls for the television camera assembly being positioned remotely from the television camera assembly.

4,695,882

MOVEMENT ESTIMATION SYSTEM FOR VIDEO SIGNALS USING A RECURSIVE GRADIENT METHOD

Masahiro Wada, and Hirohisa Yamaguchi, both of Tokyo, Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1985, Ser. No. 696,371
Claims priority, application Japan, Jan. 30, 1984, 59-13501
Int. Cl.[4] H04N *7/12, 7/18*
U.S. Cl. 358—136 **4 Claims**



1. A movement estimation system for a video signal using a gradient method which estimates movement of a picture block between a present frame and a preceding frame based on the relations of a spatial gradient of a video signal in a frame and difference between present frame and preceding frame; said system comprising:

a buffer memory for storing a video signal of present frame;

a frame memory for storing a video signal of preceding frame;

a movement calculator for providing estimation of movement of a block in a picture using contents in said buffer memory and said frame memory;

a factor adder for accumulating output of said movement calculator; and

a convergence sensor for continuing and/or stopping said movement calculator upon detection that output of said movement calculator is larger or less than a predetermined value, such that a gradient method is carried out interatively to provide a series of sub-movements which are provided by said movement calculator until a sub-movement V1 is obtained between a block (B) in a present frame and a block (B'1) in a preceding frame, a second sub-movement V2 is obtained between said block (B) and a block (B'2) defined by said first movement (V1) in the preceding frame, i'th sub-movement, when I is an integer, is obtained between said block (B) and a block defined by preceding sub-movements in the preceding frame, and resultant movement (V) is given as the sum ($V = V1 + V2 + \cdots$) of each of said sub-movements.

4,695,883

DIGITAL VIDEO COMPRESSION SYSTEM WITH VARIABLE DIGITAL FILTER

Van S. Chandler, Fort Worth, and Robert A. Arnstein, Dallas, both of Tex., assignors to Concept Communications, Inc., Stamford, Conn.

Filed Oct. 24, 1985, Ser. No. 790,869
Int. Cl.[4] H04N *7/12, 11/06, 11/20, 1/419*
U.S. Cl. 358—138 **20 Claims**

1. A method of compressing television video frames for display, comprising in combination:

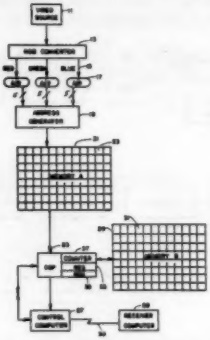
(a) digitizing a first frame into digital pixel values representing red, green and blue components of each pixel of the first frame;

(b) storing the pixel values in a memory A in consecutive locations;

(c) storing a selected form of the values into a memory B in consecutive locations;

(d) digitizing a next frame into digital pixel values representing red, green, and blue components of each pixel of the next frame;

(e) storing the pixel values of said next frame into memory A, replacing the stored pixel values of the the first frame;



(f) determining the differences between selected forms of the values of said next frame with the selected forms from the first frame previously stored in memory B;

(g) comparing the differences determined in step (f) with a predetermined filter number; and

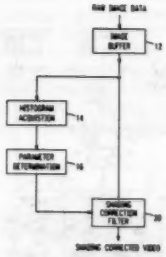
(h) outputting for display only the pixel values stored in memory A for which the differences determined in step (f) were greater than the filter number.

4,695,884

CORRECTION OF SHADING EFFECTS IN VIDEO IMAGES

Dimitris Anastassiou, New York, and William B. Pennebaker, Carmel, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 454,909, Dec. 30, 1982, abandoned. This application Feb. 1, 1985, Ser. No. 697,300
Int. Cl.[4] H04N *5/14, 5/228;* **G06K** *9/38*
U.S. Cl. 358—163 **12 Claims**



1. A method for correcting shading effects in a video image using a histogram of gray scale intensity values of picture elements or pels making up the image, which histogram contains a median and black and white color extremes, comprising the steps of:

generating a histogram of distribution of gray scale intensity values of the pels in an original image to be corrected:

determining an acceptable range of background intensity values by:

calculating the median and the black and white color extremes in the histogram: and

calculating the distance between the histogram median and the color extreme on the side of the median having the majority of gray scale intensity values and setting said range as twice that distance centered at the median;

creating a first background image by sampling the gray scale intensity value of each pel to be corrected and setting all values outside of said acceptable range to that of the color extreme least distant therefrom;

creating a duplicate background image from said first background image;

sampling the gray scale values of a number of pels in a predetermined region around a first pel in said duplicate background image;

changing the value of the pel in said first background image corresponding to said first pel, to the largest value among those of said first pel and the sampled pels;

continuing the foregoing sampling and changing steps until all of the pel values in said first background image have been changed accordingly;

changing the duplicate background image in accordance with the changes in said first background image;

repeating the sampling step over a larger region and a larger number of pels with the corresponding changing in the first background image; and

repeating the foregoing changing until a desired corrected background image is obtained which becomes the shading correction for the original image.

4,695,885

AUTOMATIC BRIGHTNESS CONTROL DEVICE

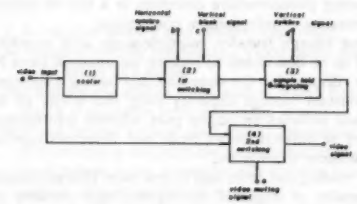
Joo W. Kim, Kuro-Apartment 3 dong, Room 301, Kuroku, Seoul, Rep. of Korea

Filed Dec. 27, 1985, Ser. No. 813,700

Claims priority, application Rep. of Korea, Dec. 28, 1984, 14312/84[U]

Int. Cl.[4] H04N *5/235, 5/57*

U.S. Cl. 358—168 **5 Claims**



1. An automatic brightness control device for preventing deterioration of large quality caused by frequent image muting to delete unnecessary images on a video screen which comprises:

an input terminal for receiving an integrated image signal,

a scaler connected to said input terminal for providing a mean value signal of the input signal,

first switch means connected to said scaler for transmitting an output signal of the scaler in response to a horizontal synchronizing signal and a vertical blanking signal,

sample/hold and integrating circuit connected to said first switch means for integrating the mean value signal and a vertical synchronizing signal sample, and holding the mean value signal until the integrating circuit is reset, and

second switch means connected to said sample/hold for transmitting the mean value signal in response to a video muting signal when the image signal is turned off.

4,695,886

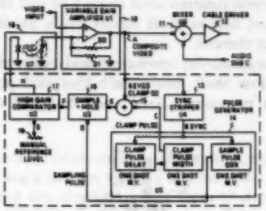
AUTOMATIC LEVELING CIRCUIT FOR A COMPOSITE VIDEO SIGNAL

William S. Schofield, Whitesville, Ky., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 7, 1985, Ser. No. 785,007

Int. Cl.[4] H04N *5/53*

U.S. Cl. 358—176 **5 Claims**



1. A circuit for automatically leveling to a desired amplitude level a composite video signal having horizontal synchronizing pulses and a video portion whose amplitude level bears a standard relationship to the amplitude level of the horizontal synchronizing pulses, comprising:

A. means for supplying the composite video signal at an amplitude level typically differing from the desired amplitude level,

B. a wideband variable gain amplifier, for producing a composite video output signal, comprising an operational amplifier having a non-inverting terminal coupled to the composite video signal, an inverting terminal, and an output terminal and having a gain determined by the relationship of a first resistance (R_f), coupled between said output terminal and said inverting input terminal, and a second resistance (R_g) coupled between said inverting terminal and ground, said second resistance (R_g) being formed at least in part by a photo-sensitive resistor,

C. means coupled to the output terminal of said operational amplifier for developing an electrical quantity proportional to the amplitude level of the horizontal synchronizing pulses in the composite video output signal, and

D. a comparator, having first and second inputs, an adjustable reference amplitude level applied to the first input, and said electrical quantity proportional to the amplitude level of the horizontal synchronizing pulses applied to the second input, for producing an output dependent upon the difference between the amplitude levels of said first and second inputs, and

E. a light emitting diode, whose energization is controlled by the output of said comparator, optically coupled to said photo-sensitive resistor to vary the gain of the operational amplifier in a sense to maintain the amplitude level of the composite video output signal in substantial equality with said adjustable reference amplitude level, while maintaining accurate differential phase and differential gain.

4,695,887

VARIABLE SPEED VIDEO CAMERA

Dean M. Peterson, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 13, 1986, Ser. No. 930,199

Int. Cl.[4] H04N *5/225;* **G03B** *9/10*

U.S. Cl. 358—213.13 **4 Claims**

1. A variable speed video camera comprising:

an image sensor;

first and second shutter discs, each of which has opening means which are alignable with said image sensor;

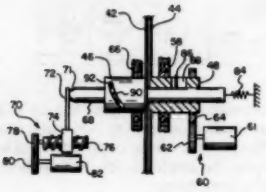
first and second hollow shaft means for respectively rotatably mounting said first and second shutter discs, said first and second shaft means having axes of rotation which

coincide but are spaced from each other so as to mount said first and second shutter discs at a fixed distance with respect to each other;

a push rod which is mounted coaxially with the axes of rotation of said first and second shutter discs and which is axially slidably mounted within said first and second hollow shaft means;

first linkage means for linking said first shutter disc with said first hollow shaft means such that said push rod is constrained against rotation with respect to said first shutter disc and first hollow shaft means but is axially slidable with respect thereto;

second linkage means for connecting said push rod with said second hollow shaft means such that said push rod is movable in concurrent axial and rotational movement



with respect to said second hollow shaft means in a helical locus of movement;

means connected to one of said first or second hollow shaft means for rotating said hollow shaft means at a fixed rotational speed wherein rotation of said first or second shaft means is transmitted to said push rod and to said other of said first and second shaft means by said first and second linkage means so that said first and second shutter discs are rotated at said rotational speed; and

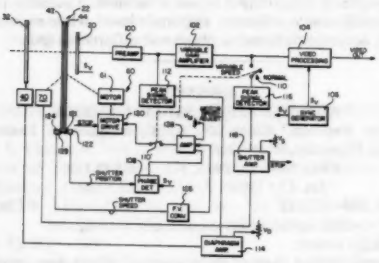
means for slidably moving said push rod within said first and second hollow shaft means in order to vary the rotational position of said first and second shutter discs with respect to each other, thereby to vary the relative opening between said first and second opening means to vary the speed of said shutter.

4,695,888

VIDEO CAMERA WITH AUTOMATICALLY VARIABLE DIAPHRAGM AND SHUTTER SPEED CONTROL

Dean M. Peterson, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 13, 1986, Ser. No. 930,200
Int. Cl.[4] H04N *5/30*
U.S. Cl. 358—213.13 **2 Claims**



1. A video camera with automatically variable diaphragm and shutter speed control, comprising:

image sensor means for converting the image of a scene into a video signal having a predetermined image repetition rate;

variable diaphragm means for controlling the light intensity of said image on said sensor;

variable shutter means for controlling the interval within an image repetition interval during which said sensor is exposed to said image; and

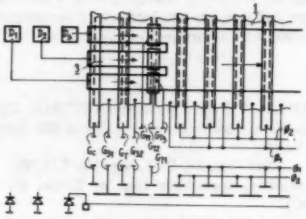
control means for controlling the peak to peak level of said video signal at a constant level in response to changing light intensity of said image by first, setting said variable shutter means to the shortest exposure interval while controlling said variable diaphragm means in response to varying light intensity and, second, when said variable diaphragm means is opened to its maximum opening, by controlling said variable shutter means to increase the exposure interval while maintaining said diaphragm means at said maximum opening.

4,695,889

CHARGE ACCUMULATION READ-OUT DEVICE WITH SIMULTANEOUSLY READ MULTIPLE OUTPUT SIGNALS

Jacques Portmann, St. Egreve, France, assignor to Thomson CSF, Paris, France

Filed Feb. 12, 1986, Ser. No. 828,743
Claims priority, application France, Feb. 12, 1985, 85 01972
Int. Cl.[4] H04N *1/024*
U.S. Cl. 358—213.26 **14 Claims**



1. A charge accumulation read-out device for information signal producing photosensitive detectors in a line to ensure in-phase summation of information, comprising:

at least one charge transfer, multiple-stage shift register, adapted to be connected to receive information from N detectors disposed in the same line, and having a substantially constant storage capacity over the whole of its length and includes an output port wherein information collected at different times from said detectors can be output without mixing; and

means for reading out, from said output port, charges stored in a plurality of stages of the register, said plurality of stages being read-out simultaneously to provide an in-phase summation of the informations.

4,695,890

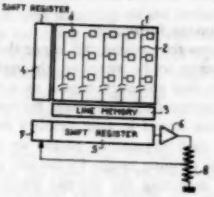
LINE TRANSFER READING DEVICE WITH FEEDBACK REGULATING THE DRIVE CHARGE

Gilles Boucharlat, and Louis Brissot, both of St. Egreve, France, assignors to Thomson-CSF, Paris, France

Filed Apr. 7, 1986, Ser. No. 849,197
Claims priority, application France, Apr. 19, 1985, 85 06009
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—213.31 **2 Claims**

1. A device for reading a matrix of photosensitive detectors by line transfer, having a stage for series injection of a drive charge at the input of a register ensuring the reading successively of each line of detectors of the matrix, which device comprises means providing feedback of a portion of the video signal from a line of the matrix which is read to the injection

stage so as to modulate the value of the drive charge which is added to the video signal of the line of the matrix which will



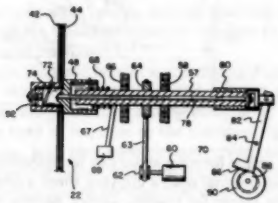
then be read, this modulation being directly proportional to the video signal of the line which is read and dependent on the transfer inefficiency of the device.

4,695,891

VARIABLE SPEED VIDEO CAMERA

Dean M. Peterson, Escondido, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 13, 1986, Ser. No. 930,201
Int. Cl.[4] H04N *5/30*
U.S. Cl. 358—213.13 **3 Claims**



1. A variable speed video camera comprising:

an image sensor for producing a video signal representative of an image of a scene;

first and second shutter discs, each of which has an aperture which is alignable with said image sensor;

first and second hollow shaft means for respectively rotatably mounting said first and second shutter discs, said first shaft means being rotatably and slidably mounted on a portion of said second shaft means;

a cable which is connected at one end to said first shaft means, which extends through said first and second hollow shaft means and which is connected at its other end to a control member;

linkage means for linking said first and second hollow shaft means for concurrent axial and rotational displacement in a helical locus with respect to each other;

means for rotating said first and second shaft means at a predetermined rotational speed thereby rotating said first and second shutter discs at said predetermined speed; and

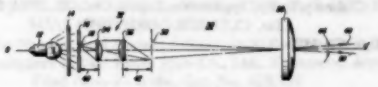
means for actuating said control member in response to a change in signal intensity of said sensor to thereby move said cable to cause said first shaft means to move in said helical locus of displacement relative to said second shaft means whereby said first and second shutter discs are rotated relative to each other to change the relative opening between said discs and thereby the shutter speed at which said sensor is exposed to said image.

4,695,892

METHOD FOR DETERMINING THE ANGULAR DIMENSIONS OF A SCENE RECORDED BY A VIDEO SYSTEM

Donald J. Mary, New Carrollton, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 27, 1986, Ser. No. 880,512
Int. Cl.[4] H04N *5/272, 5/225*
U.S. Cl. 358—225 **7 Claims**



1. A method of calibrating a video system, including a video camera having a lens for viewing a scene and a video recorder for recording the scene on video tape, to determine angular dimensions of the scene, comprising the steps of:

focusing the video camera lens for infinity;

projecting into the video camera lens an image of an illuminated reticle pattern of known angular shape and size formed at infinity; and

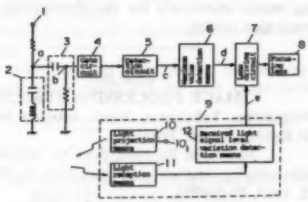
recording the image projected into the video camera lens on the video tape.

4,695,893

AUTOMATIC FOCUSING APPARATUS

Hiroshi Makino, Hirakata; Tsunemi Yoshino, Nara; Tadaharu Kihara, Habikino, and Akira Takashima, Osaka, all of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

PCT No. PCT/JP85/00072, § 371 Date Oct. 4, 1985, § 102(e) Date Oct. 4, 1985
PCT Filed Feb. 20, 1985, Ser. No. 786,959
Claims priority, application Japan, Feb. 21, 1984, 59-30858; Feb. 24, 1984, 59-34655
Int. Cl.[4] H04N *5/232;* **G03B** *3/00*
U.S. Cl. 358—227 **15 Claims**



1. An automatic focusing apparatus with a lens movement termination means, comprising:

a sharpness signal generation means which detects a sharpness signal from high-frequency components of a brightness signal contained in a video signal corresponding to an object;

a maximum value detection means which generates a lens movement termination signal which stops movement of a focusing lens when said sharpness signal has a peak value;

a distance variation detection means comprising a light projection means which projects a specified amount of infrared light onto said object, a light reception means which receives reflected lights caused by projection of said specified amount of infrared light onto said object, and a received light signal level variation detection means which detects variations of the light level of said reflected infrared light for issuing a lens movement start signal; and

a lens driving means including a driving source for control-

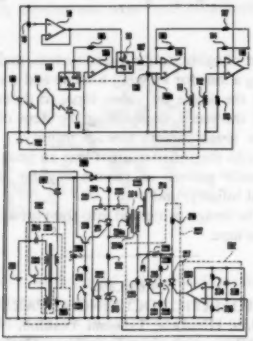
ling the movement of a lens in response to said lens movement termination signal and said lens movement start signal.

4,695,894

EXPOSURE CONTROL APPARATUS

Syuichiro Saito, Kanagawa, and Tadashi Okino, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Japan

Division of Ser. No. 565,618, Dec. 27, 1983, Pat. No. 4,563,070.
This application May 10, 1985, Ser. No. 733,123
Claims priority, application Japan, Dec. 28, 1982, 57-230077
Int. Cl.[4] G03B *7/085*; H04N *5/238*
U.S. Cl. 358—228 **17 Claims**



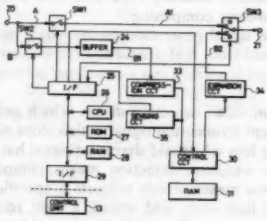
1. An image pick-up apparatus, comprising:
(a) image receiving means for pick-up an image of an object;
(b) light metering means for detecting the brightness of the object;
(c) illumination means for illuminating the object;
(d) restriction means for restricting the amount of light incidence on the image pick-up means; and
(e) changeover means for using an output of the light metering means selectively for the illumination means or the restriction means.

4,695,895

IMAGE PROCESSING SYSTEM

Nao Nagashima, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 26, 1984, Ser. No. 665,353
Claims priority, application Japan, Nov. 2, 1983, 58-204757; Nov. 2, 1983, 58-204758
Int. Cl.[4] H04N *1/04*
U.S. Cl. 358—280 **8 Claims**



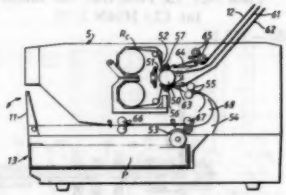
1. An image processing system comprising:
input means for entering image data;
means for compressing the image data entered by said input means;
memory means for storing the image data compressed by said compressing means;
means for expanding the image data stored in said memory means;
means for image formation;
control means for causing the image data entered from said input means to be supplied through said compressing means to said memory means as well as to said image forming means for a first image formation and causing the image data stored in said memory means to be supplied through said expanding means to said image forming means for ensuing image formation; and
means for detecting the storage status of the compressed image data in said memory means;
wherein said control means is adapted to cause the image data entered from said input means to be supplied to said image forming means for the ensuing image formation, when said detecting means detects an improper storage of the compressed image data in said memory means.

4,695,896

IMAGE FORMING APPARATUS

Eiichi Yamanishi, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 24, 1985, Ser. No. 726,468
Claims priority, application Japan, May 30, 1984, 59-110263
Int. Cl.[4] H04N *1/23*
U.S. Cl. 358—296 **19 Claims**



1. An image forming apparatus for transferring a color pattern of an original onto a copying sheet, comprising:
reading means for reading a color pattern of said original;
conversion means for converting the color pattern read by said reading means into a color signal indicative thereof;
transfer means for transfering on said copying sheet according to said color signal, said transfer means including a plurality of colors;
means for selectively commanding one of a 2-color nonlap print mode and a lap print mode; and
image forming means for selecting one color of said plurality of colors of the transfer means according to said color signal for one picture element of said copying sheet when said commanding means commands a two color nonlap print mode, and for transferring only said one color onto said picture element of said copying sheet.

4,695,897

IMAGE BUILDING APPARATUS

Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

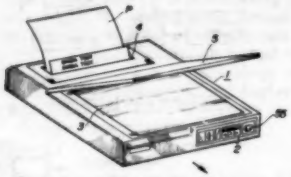
Filed Nov. 7, 1985, Ser. No. 795,921
Claims priority, application Japan, Nov. 7, 1984, 59-234623
Int. Cl.[4] H04N *1/21*; G03G *15/00*; G01D *15/10*
U.S. Cl. 358—296 **23 Claims**

1. An apparatus for forming an image of an original on a printing medium, comprising:
a housing having a front forward portion and a top upper portion;
an original holding board on the top upper portion of said housing for holding the original thereon;
scanning means disposed below said original holding board,

said scanning means for moving in a transverse direction as seen from the front of said housing to scan the original on the original holding board to read image information off the original, said scanning means including,

a first carriage including a lamp for emitting a light beam toward the original and a first mirror against which the light beam transmitted from the original is reflected, said first carriage being adapted to move along the original in a direction transverse to the front of said housing,

a second carriage including second and third mirrors against which the light beam transmitted from the first mirror is reflected, said second carriage adapted to move parallel to the direction of movement of the first carriage, the speed of movement of said second carriage



being half of the speed of movement of said first carriage,

lens means disposed in the path of the light beam transmitted from the third mirror, and

photoelectric converting means into which the light beam is introduced after passing through said lens means for outputting an electrical signal in response to the introduced light beam; and

printing means disposed behind said scanning means as seen from the front of the housing, said printing means for forming an image on the printing medium by driving a recording head in response to the electrical signal transmitted from said photoelectric converting means, said printing medium being transported in a direction substantially perpendicular to the direction of movement of said scanning means.

4,695,898

FACSIMILE MACHINE USING CUT SHEETS OF PAPER

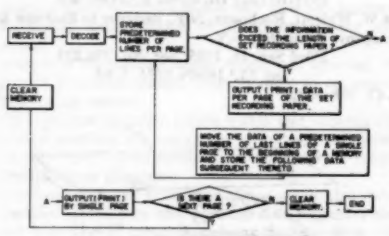
Kazumasa Ishikawa, Kawasaki, and Yuji Koseki, Machida, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 18, 1986, Ser. No. 875,599

Claims priority, application Japan, Jun. 20, 1985, 60-132943

Int. Cl.⁴ H04N *1/21, 1/23, 1/00, 1/40*

U.S. Cl. 358—296 **13 Claims**


RECEIVE
DECODE
STORE PREDETERMINED NUMBER OF LINES PER PAGE
DOES THE INFORMATION EXCEED THE LENGTH OF SET RECORDING PAPER ?
CLEAR MEMORY
OUTPUT (PRINT) DATA PER PAGE OF THE SET RECORDING PAPER
MOVE THE DATA OF A PREDETERMINED NUMBER OF LAST LINES OF A SINGLE PAGE TO THE BEGINNING OF A MEMORY AND STORE THE FOLLOWING DATA SUBSEQUENT THERETO
OUTPUT (PRINT) BY SINGLE PAGE
IS THERE A NEXT PAGE ?
CLEAR MEMORY
END

1. A method for recording data in a facsimile machine using cut sheets of recording paper of a predetermined size, comprising the machine-implemented steps of:

determining whether or not a larger cut sheet of paper is required for recording said data than said predetermined size; and

recording a predetermined number of lines recorded at the end of a cut sheet of recording paper at the beginning of a next cut sheet of recording paper if a larger cut sheet of paper is required for recording said data than said predetermined size.

4,695,899

RECORDING AND REPRODUCING SYSTEM EMPLOYING BALANCED MODULATION FOR COLOR VIDEO SIGNAL

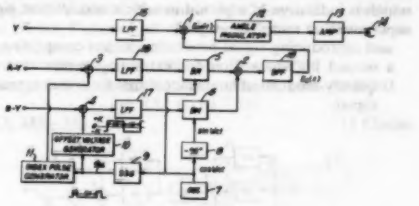
Masahiko Nagano, and Naoaki Sakaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 27, 1984, Ser. No. 675,289

Claims priority, application Japan, Nov. 30, 1983, 58-225990

Int. Cl.⁴ H04N *9/79*

U.S. Cl. 358—310 **6 Claims**



1. A color video signal recording system comprising:

means for modulating a first color signal and a second color signal onto a subcarrier by a quadrature two-phase balanced modulation;

means for generating a reference phase signal having a frequency equal to the frequency of said subcarrier;

multiplexing means for combining said reference phase signal with a modulated color signal outputted by said modulation means and with a luminance signal, said multiplexing means outputting a multiplexed signal wherein said reference phase signal is frequency-interleaved with said modulated color signal;

means for applying an angle modulation to said multiplexed signal; and

means for recording on a recording medium an angle-modulated signal outputted by said angle modulation means

---

4,695,900

MAGNETIC RECORDING AND PLAYBACK APPARATUS FOR TELETEXT SIGNALS

Masahiro Honjo, Neyagawa, and Akio Hashima, Tuzuki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 12, 1985, Ser. No. 722,452

Claims priority, application Japan, Apr. 12, 1984, 59-73231; Apr. 13, 1984, 59-75529; Nov. 20, 1984, 59-245128

Int. Cl.⁴ H04N *9/79*

U.S. Cl. 358—310 **10 Claims**

1. A magnetic recording and playback apparatus for recording on and reproducing from a magnetic recording medium a video signal on which a teletext signal is superposed, comprising:

a recording signal processing means for processing said video signal to obtain a recordable signal;

a recording head for recording said recordable signal on said recording medium;

a reproducing head for reproducing the recorded signal from said recording medium; and

a reproduced signal processing means for processing the reproduced signal from said reproducing head to obtain a

reproduced video signal which is equivalent to said video signal,

said recording signal processing means comprising:

a first low-pass filter for extracting a luminance signal from said video signal;

a frequency modulator for frequency-modulating said luminance signal;

a first high-pass filter for reducing noise components contained in the frequency-modulated luminance signal;

a first band-pass filter for extracting a chrominance signal from said video signal;

a first frequency converter for converting a frequency band of said chrominance signal to a low frequency band;

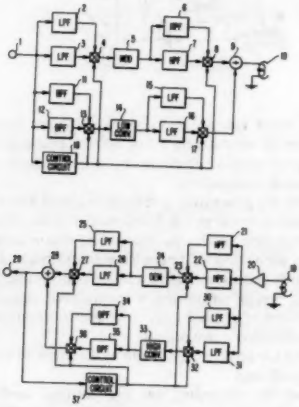
a second low-pass filter for reducing noise components contained in the low-frequency-band chrominance signal;

a first mixer for mixing output signals of said first high-pass and second low-pass filters to obtain said recordable signal; and

a first control means for producing a first control signal which is indicative of a period in which said teletext signal is superposed on said video signal,

said reproducing signal processing means comprising:

a second high-pass filter for extracting a reproduced frequency-modulated luminance signal from said reproduced signal;



a frequency demodulator for frequency-demodulating said reproduced frequency-modulated luminance signal to obtain a reproduced luminance signal;

a third low-pass filter for reducing noise components contained in said reproduced luminance signal;

a fourth low-pass filter for extracting a reproduced low-frequency-band chrominance signal from said reproduced signal;

a second frequency converter for converting said low frequency band of said reproduced low-frequency-band chrominance signal to said frequency band of said chrominance signal to obtain a reproduced chrominance signal;

a second band-pass filter for reducing noise components contained in said reproduced chrominance signal;

a second mixer for mixing output signals of said third low-pass and second band-pass filters to obtain said reproduced video signal; and

a second control means for producing a second control signal which is indicative of a period in which said teletext signal is superposed on said reproduced video signal,

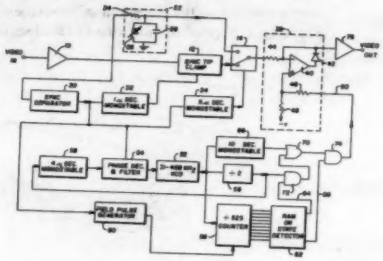
wherein at least one of said first low-pass and first high-pass filters is adapted to widen its frequency passband in response to said first control signal, and at least one of said second high-pass and third low-pass filters is adapted to widen its frequency passband in response to said second control signal, thereby passing said teletext signal, which has a wide frequency band.

4,695,901

METHOD AND APPARATUS FOR REMOVING PSEUDO-SYNC AND/OR AGC PULSES FROM A VIDEO SIGNAL

John O. Ryan, Cupertino, Calif., assignor to Macrovision, Santa Clara, Calif.

Filed Mar. 4, 1986, Ser. No. 836,019
Int. Cl.[4] H04N *5/76*
U.S. Cl. 380—5 **31 Claims**



1. A method of removing pseudo-sync pulses added after normal sync pulses to a video signal for inhibiting the making of acceptable video recordings of the video signal, comprising the steps of:

providing a selectively-operable negative-peak clipping device to pass unchanged the video signal in one operation state thereof and to pass the video signal with selected negative-value components thereof removed in a second operation state thereof;

detecting normal sync pulses and pseudo-sync pulses of the video signal;

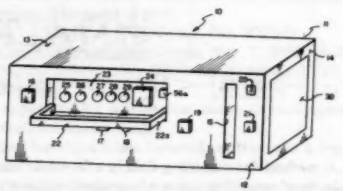
selectively operating the clipping device in accordance with the detected sync pulses so that the video signal is padded by the clipping device unchanged during the detection of normal sync pulses and passed by the clipping device as modified by the second operation state thereof during the detection of at least some of the pseudo-sync pulses, thereby outputting a video signal which is regenerated free from at least some of the added pseudo-sync pulses to permit more acceptable video recordings thereof.

4,695,902

COLOR VIDEO PRINTER INCLUDES A COLOR VIEWER AND IMAGE ADJUSTMENT CONTROLS WHICH ARE INHIBITED DURING EXPOSURE

Dana W. Wolcott, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,233
Int. Cl.[4] H04N *9/81, 5/84*
U.S. Cl. 358—332 **4 Claims**



1. Color video printer apparatus comprising:

monochrome display means for displaying an image of a video signal;

an exposure station which is located along a first optical path from said display means and at which is located a photographic element;

an image viewing station;

an optical assembly movable between an exposing position out of said first optical path and a viewing position intercepting said first optical path to establish a second optical path between said image viewing station and said display means;

first and second continously moving color filters, each of which has first, second and third primary color filters sequentially movable into said respective first and second optical paths in synchronism with the field frequency of a video signal applied to said display means; and

selectively actuatable means coupled to said optical assembly for moving said assembly (1) to said exposing position to permit the exposing of a photographic element at said exposure station to color images produced by said display means and said first color filter and (2) to said viewing position to permit the viewing at said image viewing station of color images produced by said display means and said second color filter.

4,695,903

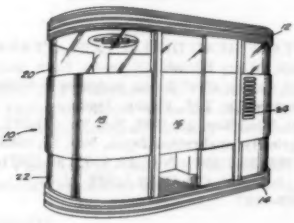
AUDIO VIDEO ENTERTAINMENT MODULE

Earl Serap, and Deborah Serap, both of Santa Monica, Calif., assignors to Deborah Pauline Schuman, Los Angeles, Calif.

Filed Jun. 17, 1985, Ser. No. 745,613

Int. Cl.[4] H04N 5/76

U.S. Cl. 358—335 **8 Claims**



1. An entertainment module for presenting prerecorded visual and audible entertainment comprising in combination:

a. a viewing chamber adapted to substantially surround occupants for providing substantial acoustic and light isolation from the surrounding environment to enhance the presentation of visual and audible entertainment;

b. seating means within said viewing chamber for accommodating a limited number of viewers of the entertainment to be provided;

c. image presenting means within said viewing chamber for displaying visual images to occupants of said seating means;

d. acoustical transducing means within said viewing chamber for providing audible entertainment to occupants of said seating means;

e. coin operated selection means within said viewing chamber for enabling the occupants of said seating means to choose one of a predetermined inventory of pre-recorded entertainment programs;

f. audio-visual display generating means within said viewing chamber coupled to said coin operated selection means and operable in response thereto for providing visual images to said image presenting means and audible entertainment to said acoustical transducing means;

whereby an occupant of said seating means within said viewing chamber can select a pre-recorded program from an inventory of programs and by inserting one or more coins into said selection means, can cause a selected program to be visually and audibly presented in an environment that is relatively free from the ambient light and sound existing at the exterior of said viewing chamber.

4,695,904

INFORMATION SIGNAL RECORDING DISC RECORDED WITH AN END SIGNAL FOR SELECTIVELY PREVENTING UNWANTED ACCESS TO PREDETERMINED RECORDED INFORMATION AND DISC REPRODUCING APPARATUS THEREFOR

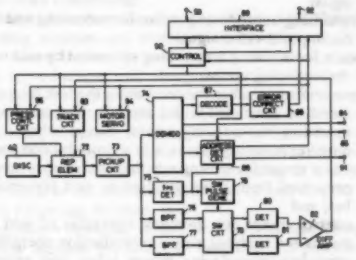
Tatsuya Shinyagaito; Terumasa Kuramoto, both of Iwai; Toyotaka Machida; Kikuji Saito, both of Kashiwa; Shunichi Shichijo, Sagamihara; Tooru Yamagishi, Tokyo; Yoshinao Kobayashi, Machida; Kazuyoshi Ishii, Sagamihara, and Atsumi Hirata, Fujisawa, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Apr. 29, 1985, Ser. No. 728,308

Claims priority, application Japan, May 1, 1984, 59-88103

Int. Cl.[4] G11B 7/00

U.S. Cl. 358—342 **11 Claims**



1. An information signal recording disc playable on a disc reproducing apparatus which comprises a reproducing element for reproducing recorded signals from track turns of the information signal recording disc, said reproducing element reproducing the recorded signals from the track turns of the information signal recording disc in a playing position and stopping the reproduction in a rest position, said information signal recording disc comprising:

a first region comprising track turns recorded with an information signal at least including a video signal;

a second region comprising track turns intermittently recorded with an end signal, said end signal being used to forcibly and automatically return the reproducing element of the disc reproducing apparatus from the playing position to the rest position, said second region being provided at a position prior to said first region in a direction of a reproducing sequence of the recorded signals on the information signal recording disc; and

a third region made up of at least one track turn, said third region being provided at a position subsequent to a position where the recording of the information signal terminates in the direction of the reproducing sequence of the recorded signals on the information signal recording disc,

said track turns being recorded with an address signal with a constant period, said address signal indicating the position on the information signal recording disc,

said end signal being recorded in place of said address signal in predetermined track turns within said second region,

said end signal being recorded in place of said address signal in all track turns within said third region.

4,695,905

VIDEO RECORDING/REPRODUCING CAMERA

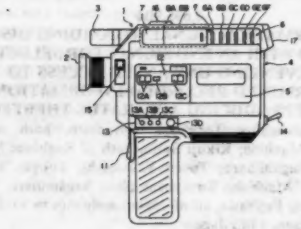
Mikio Utsugi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 17, 1985, Ser. No. 735,348

Claims priority, application Japan, May 19, 1984, 59-99722

Int. Cl.[4] H04N *5/78*

U.S. Cl. 360—33.1 **12 Claims**



1. A video recording/reproducing camera comprising:

an image pickup means for picking up an image of an object and for converting said picked up image into a video signal;

a recording/reproducing means for recording and/or reproducing said video signal;

means for initiating a recording operation by said recording/reproducing means;

a preventing member for preventing the touching of control members associated with a reproduction operation of said recording/reproducing means, except when said recording/reproducing means is in a reproduction mode;

a sensor means for sensing whether said control members are prevented from being touched by said preventing member; and

a control means for disabling operation of said initiating means and enabling only a reproduction operation of said recording/reproducing means when said sensor means detects that said preventing member permits the touching of said control members, and for enabling operation of said initiating means when said sensor means detects that the touching of said control members is prevented.

4,695,906

APPARATUS FOR QUICK STARTING TAPE IN VIDEO CASSETTE RECORDERS

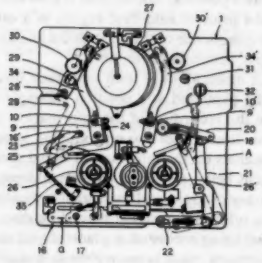
Jin H. Kim, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 26, 1985, Ser. No. 813,613

Claims priority, application Rep. of Korea, Dec. 28, 1984, 1984-8495

Int. Cl.[4] G11B *5/027, 15/665*

U.S. Cl. 360—85 **1 Claim**



1. An apparatus for quick starting of tape forwarding-and-rewinding operations for a video cassette recorder, said apparatus comprising:

(a) a cam gear (2) which is mounted under the recorder main deck (1), rotates through a connecting gear (5) by a loading motor (4), and has guide grooves (3, 3') at its bottom and top surfaces;

(b) a sector gear (6) which is rotatable by means of a guide pin (6') captured in the said guide groove (3') and in turn rotates ring gears (8, 8') through transmission gears (7, 7');

(c) loading plates (9, 9') having loading rollers (10, 10') and loading poles (11, 11') which are elastically connected to the said ring gears (8, 8') by tension springs (14, 14') and also additionally by supporting plates (12, 12') and connecting pins (13') inserted in openings (13) formed in the said ring gears (8, 8'), the said loading rollers (10, 10') and loading poles (11, 11') being exposed above the recorder main deck (1) through loading holes (34, 34') formed in the recorder main deck (1);

(d) an operating rod (15) which has a guide pin (15') captured in the guide groove (3) and is connected to a slide plate (16) above the recorder main deck (1) by a connecting pin (17), the front end of the slide plate (16) being connected to the tension rod (21) through a connecting rod (22);

(e) a pinch arm (20) which is formed with a pinch roller (18) and a guide roller (19) on each end of it and operated by the said tension rod (21); and

(f) a guide pin (16') which is installed on the front end of the operating rod (15) and protrudes above the recorder main deck (1) through a guide hole (23), the said guide pin (16') serving to guide a tension arm (25) with a tension pole (24).

4,695,907

ROTARY HEAD DEFLECTION APPARATUS

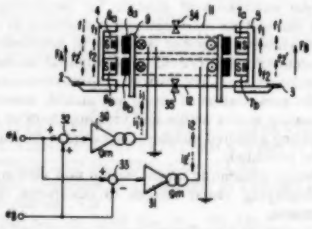
Toshio Inaji, Mino; Hiroshi Okamoto, Nara, and Nobuyoshi Yokobori, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 15, 1984, Ser. No. 671,583

Claims priority, application Japan, Nov. 15, 1983, 58-215488; Nov. 21, 1983, 58-218911; Nov. 29, 1983, 58-224716

Int. Cl.[4] G11B *5/588, 21/04*

U.S. Cl. 360—107 **6 Claims**



1. A deflectable rotary head assembly comprising:

a rotary member rotatable around an axis of rotation;

first and second movable members each of which is mounted on said rotary member for displacement in opposite directions parallel to the axis of rotation of said rotary member;

a magnetic head mounted on each of said first and second movable members;

first and second magnets mounted on each of said first and second movable members and positioned relative to each other in a direction parallel to said axis of rotation, the first and second magnets on said first movable member being magnetized to have the like polarities aligned in a direction parallel to the axis of rotation and the first and second magnets on said second movable member being magne-

tized to have unlike polarities aligned in a direction parallel to the axis of rotation;

a stationary member having a cylindrical surface with the cylindrical axis coinciding with the axis of rotation of said rotary member;

first and second driving coils wound on said cylindrical surface of said stationary member and being spaced at predetermined distances from said first and second magnets on each of said first and second movable members and positioned for urging said first and second magnets, respectively, in directions parallel to said axis of rotation; and

control circuit means for feeding first and second control currents to said first and second driving coils, respectively, for producing urging forces on said magnets for independently urging said first and second magnets on one of said movable members in either an up or down direction while urging the first and second magnets on the other of said movable members in opposite directions,

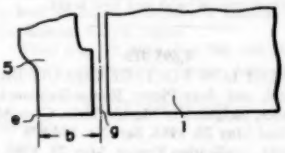
whereby each of said first and second movable members can be displaced in a direction paralle to the axis of rotation of said rotary member in response to said first and second control currents for urging the magnetic head on one of said first and second movable members up or down while the other movable member remains fixed.

4,695,908

THIN FILM TYPE MAGNETIC TRANSDUCER HEAD

Shigeyoshi Imakoshi; Yutaka Soda, and Hideo Suyama, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 23, 1984, Ser. No. 643,542
Claims priority, application Japan, Aug. 29, 1983, 58-157647
Int. Cl.[4] G11B *5/23*
U.S. Cl. 360—119 **3 Claims**



1. A thin film type magnetic transducer head comprising a magnetic substrate, and a thin film magnetic core forced on said substrate through an effective magnetic gap at one end of said substrate arranged to face a travelling magnetic recording medium, said magnetic substrate and said thin film magnetic core forming a magnetic circuit to reproduce signals on said travelling magnetic medium, wherein a length b and a wave length $\lambda m = v/f_m$ satisfy the following relations

$$b < 0.64\lambda m, \text{ or } 0.83\lambda m < b < 1.61\lambda m$$

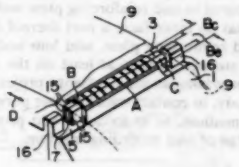
wherein b is the thickness of said thin film magnetic core facing said travelling magnetic recording medium plus one-half the gap length of said effective magnetic gap, v is the relative velocity of said travelling magnetic recording medium to said magnetic transducer head, and f_m is maximum frequency or half of transmission rate.

4,695,909

MAGNETIC HEAD ASSEMBLY

Kazuhiro Momata, Chigasaki; Yoshinori Dekura, Ebina; Tadashi Honzawa, and Hiromi Matsushige, both of Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 8, 1984, Ser. No. 669,583
Claims priority, application Japan, Nov. 10, 1983, 58-211294
Int. Cl.[4] G11B *5/187, 5/29, 15/64, 5/10*
U.S. Cl. 360—122 **19 Claims**



1. A magnetic head for performing recording or reproduction on or from a flexible magnetic recording medium, wherein said magnetic head and said flexible recording medium are arranged to be movable relative to each other, and said flexible recording medium is movable in a transport direction, said magnetic head comprising:

an elongated surface member opposite to said flexible recording medium and receiving electromagnetic conversion means therein for enabling at least one of recording and reproduction, said elongated surface member being arranged for supporting said flexible recording medium through a fluid pressure during transport of said flexible recording medium, said elongated surface member having opposite end portions and a central portion therebetween, said elongated surface member extending in a direction transverse to the transport direction of said flexible magnetic recording medium; and

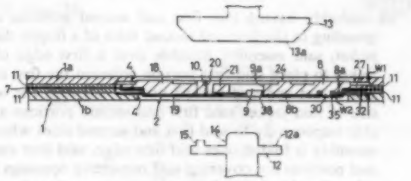
fluid pressure reducing means provided in said elongated surface member proximate to both opposite end portions of said elongated surface member for enabling the fluid pressure existing between said flexible magnetic recording medium and said elongated surface member to be smaller in an area proximate to both opposite end portions than in an area at the central portion of said elongated surface member.

4,695,910

RECORDING DISC CARTRIDGE HAVING AN IMPROVED HUB ASSEMBLY

Hiroshi Maruyama, Yuki; Kunio Mizushima, Toride; Akito Sakemoto, Tsukuba, and Nobuhiro Umebayashi, Yuki, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jul. 31, 1984, Ser. No. 636,377
Claims priority, application Japan, Aug. 3, 1983, 58-142359
Int. Cl.[4] G11B *23/03*
U.S. Cl. 360—133 **8 Claims**



1. A recording disc cartridge comprising a disc case having a top section and a bottom section combined together, drive shaft insertion holes defined through said top section and said bottom section, a recording disc rotatably mounted in said disc

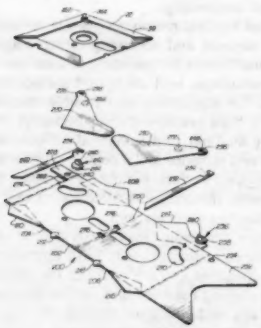
case, said recording disc including a recording medium and a hub assembly disposed about said drive shaft insertion holes, said hub assembly supporting said recording medium at a central portion of said recording medium, a spindle insertion hole defined at a central portion of said hub assembly and a drive pin engaging means defined at a position apart radially outward from said spindle insertion hole, characterized in that said hub assembly comprises a hub body having an upper face and a lower face with a reinforcing plate formed on said lower face of said hub body, said recording medium having an inner portion secured to said reinforcing plate and said spindle insertion hole has an inner face, a part thereof being formed by a part of said reinforcing plate, said hub body having an outer peripheral stepped portion at least on the upper face of said hub body providing an annular flange projecting outward from said hub body, in contact with an inner peripheral edge of said recording medium, so as to cover and protect said inner peripheral edge of said recording medium.

4,695,911

FLOPPY DISKETTE PROTECTION DEVICE

Ron Loosen, 10885 Portal Dr., Los Alamitos, Calif. 90720

Filed May 3, 1985, Ser. No. 730,678
Int. Cl.[4] G11B *23/03*
U.S. Cl. 360—133 **13 Claims**



1. A device for installation onto a jacketed floppy diskette having a jacket with a first side and a second side on opposite sides of a disk and four edges at which said first and second sides meet at their perpheries, said floppy diskette having a central opening and a read-write access opening in each side of said jacket said floppy diskette of the type which is typically inserted into a disk drive having guides for opposing edges of the jacket, said device for protecting said floppy diskette by covering the central openings and the read-write access openings in the sides of said jacket when said floppy diskette is not in use and by uncovering said openings when said floppy diskette is in use, said device remaining installed when said floppy diskette is inserted into a disk drive, said device comprising:

an assembly having thin first and second portions corresponding to the first and second sides of a floppy diskette jacket, said assemlby foldable over a first edge of said jacket to place said first portion adjacent the first side of said jacket and said second portion adjacent the second side of said jacket, said first and second portions attachable respectively to said first and second sides when said assembly is folded over said first edge, said first and second portions not covering said respective openings in the sides of said jacket and not extending over the other edges of said floppy diskette jacket when so attached;

a first substantially flat shutter rotably held by said first portion against said first side of said jacket, said first shutter for movement in a plane generally parallel to said floppy diskette between a first position for covering said openings in said first side of said jacket and a second position for uncovering said respective openings; and

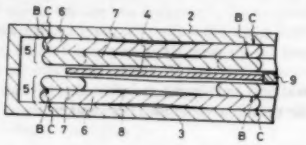
a second substantially flat shutter rotatably held by said second portion aganst said second side of said jacket, said second shutter for movement in a plane generally parallel to said floppy diskette between a first position for covering said openings in said second side of said jacket and a second position for uncovering said respective openings.

4,695,912

DUSTPROOF LINER FOR A MAGNETIC DISC CARTRIDGE

Masayoshi Moriwaki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 27, 1986, Ser. No. 866,834
Claims priority, application Japan, Jun. 14, 1985, 60-89014[U]
Int. Cl.[4] G11B *23/03*
U.S. Cl. 360—133 **8 Claims**



1. A disc cartridge, comprising:

a case having an upper case half and a lower case half,

a disc sheet having two surfaces and adapted to be rotated within said case between said upper and lower case halves; and

a first liner disposed between said disc sheet and said upper case half, and a second liner disposed between said disc sheet and said lower disc half, each liner comprising a double-layered structure with a first layer, positioned adjacent to, and secured to, a different one of said upper and lower case halves and being electrostatically chargeable, and a second layer, positioned adjacent a different one of said disc surfaces and being electrostatically nonchargeable, said first and second layers being bonded to each other, each said second layer having aperture means therein and facing a distinct recording portion of a respective one of said disc surfaces and permitting passage of dust particles from said disc sheet through said second layer aperture means onto said first layer.

4,695,913

SHUNT EFFECT LOW VOLTAGE CIRCUIT BREAKER

Claude Terracol, and Jean-Pierre Roulet-Dubonnet, both of Eybens, France, assignors to Merlin Gerin, Grenoble, France

Filed May 20, 1986, Ser. No. 864,878
Claims priority, application France, May 29, 1985, 85 08178
Int. Cl.[4] H01H *9/38, 9/40*
U.S. Cl. 361—13 **8 Claims**

1. A low voltage electrical circuit breaker having:

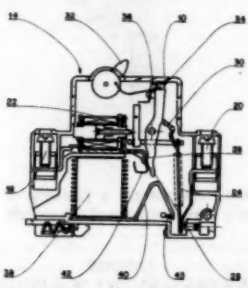
a phase pole and a neutral pole, the phase pole comprising a first pair of contacts, first input and output terminals and a first connection circuit of said first terminals in which said first pair of contacts is inserted, said first pair of contacts being connected to the first input terminal, the neutral pole comprising a second pair of contacts, second input and output terminals and a second connection circuit of said second terminals in which said second pair of contacts is inserted, an arc chute being associated only with said first pair of contacts and not with said second pair of contacts;

a first operating mechanism for manual opening and closing and automatic opening on a fault of said first pair of contacts;

an electrode disposed in proximity to and clear from said first pair of contacts so as to be insulated from the first pair

of contacts in the closed position and to pick up a drwan arc, when said first pair of contacts open on a fault;

a shunt circuit connecting said electrode to said second input terminal to create a short-circuit connection between said first and second input terminals via the contact among said first pair of contacts, an arc, said electrode and said shunt circuit, said shunt circuit being adapted to shunt said



second pair of contacts, as soon as the arc has been diverted onto said electrode and to limit the fault current flowing through said second pair of contacts; and

a second operating mechanism for opening and closing of said second pair of contacts, disposed to give said second pair of contacts an electrodynamic withstand notably lower than that of said first pair of contacts.

4,695,914

ELECTRONIC CARD CONNECTING CIRCUIT

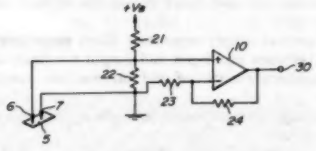
Tomonari Ohtsuki, Mooka, and Kazuyoshi Tsurumaki, Minami-Saitama, both of Japan, assignors to Daiichi Denshi Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 22, 1986, Ser. No. 899,254

Claims priority, application Japan, Aug. 23, 1985, 60-128380[U]

Int. Cl.⁴ H02H *9/08*

U.S. Cl. 361—42 **8 Claims**



1. An electronic card connecting circuit comprising first contact means earthing a ground terminal of an electronic card, second contact means electrically contacting said ground terminal to detect said ground terminal being earthed by said first contact means, and detection control means including an active element which detects said second contact means being connected through said ground terminal to said first contact means.

4,695,915

SHORT CIRCUIT AND OVERLOAD PROTECTION CIRCUIT FOR OUTPUT STAGE TRANSISTORS

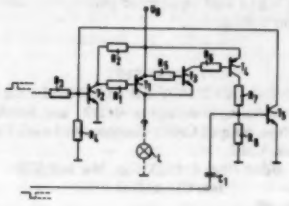
Josef Mahalek, Neufahrn, and Egon Vetter, Hofheim, both of Fed. Rep. of Germany, assignors to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Mar. 11, 1985, Ser. No. 710,513

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1984, 3409058

Int. Cl.⁴ H02H *3/08, 9/02*

U.S. Cl. 361—56 **18 Claims**



1. Short circuit and overload protection circuit for an output stage transistor which is connected to the output of a driving transistor for the output stage transistor, wherein a limitation and threshold value network means is provided for detecting the emitter collector voltage of the output stage transistor to be protected and for supplying a control voltage derived from the detected said emitter collector voltage to the base of a protective transistor, wherein the collector of this protective transistor is connected to the base of the driving transistor of the output stage transistor and the emitter of this protective transistor is connected to ground potential, and wherein the limitation and threshold value network means contains: a resistor which is located between the emitter of the output stage transistor and the base of a first switching transistor which is complementary with the output stage transistor and whose emitter is directly connected to the collector of the output stage transistor, and a further resistor which is connected between the collector of the first switching transistor and the base of a second switching transistor which is complementary with the first switching transistor, whose emitter is connected to a pole of the supply voltage source, and whose collector is connected to a voltage divider.

4,695,916

PROTECTOR CIRCUIT

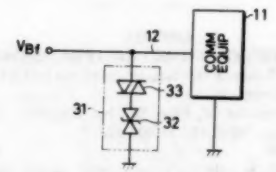
Hidetaka Satoh, Tokorozawa; Hideyuki Kurosawa, Hachioji; Yoshiaki Kamijoh, Kitatsuru, and Hiromichi Jyumonji, Kunitachi, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,825

Claims priority, application Japan, Dec. 24, 1984, 59-272555

Int. Cl.⁴ H02H *9/00*

U.S. Cl. 361—56 **12 Claims**



1. A protector circuit connected between a signal line con-

nected to a communication equipment and ground for protecting said equipment from surge voltages applied to said signal line, said signal line supplying a battery feed voltage V_{Bf} to said communication equipment, said protector circuit comprising:

a bidirectional voltage limiting element having a breakdown voltage V_B slightly higher than the battery feed voltage V_{Bf} on said signal line and lower than a predetermined non-operation voltage V_A of said protector circuit; and

a bidirectional thyristor connected in series with said bidirectional voltage limiting element, the sum of the breakover voltage V_{B0} of said bidirectional thyristor and said breakdown voltage V_B being lower than the breakdown voltage V_R of said equipment and higher than said non-operation voltage V_A.

4,695,917

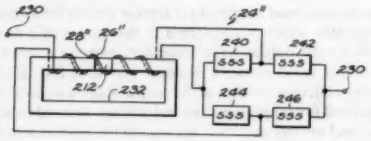
INDUCTIVE POWER CONTROLLER

Kenneth R. Jackson, Huntington Beach, and Farshid Tofigh, Mission Viejo, both of Calif., assignors to Leach Corporation, Buena Park, Calif.

Filed Dec. 4, 1985, Ser. No. 805,072

Int. Cl.[4] H02H *9/08*

U.S. Cl. 361—58 **25 Claims**



1. Apparatus for controlling power to a load, comprising:

inductive circuit means controllable between a first condition of low inductance and a second condition of higher inductance, the inductive circuit means comprising:

first coil means; and

second coil means electrically connectable to the first coil means for energization therewith to produce magnetizing forces when the inductive circuit means is in either of said first and second conditions;

the first and second coil means being constructed and arranged so that the magnetizing force produced by current flow in the second coil means opposes the magnetizing force produced by current flow in the first coil means in said first condition of low inductance and reinforces the magnetizing force produced by current flow in the first coil means in said second condition of higher inductance, with the first and second coil means connected electrically in series when the inductive circuit means is in said second condition of higher inductance;

means for applying a voltage to a load through said inductive circuit means;

means for sensing current to the load; and

means for switching the inductive circuit means from the first condition of low inductance to the second condition of higher inductance in response to sensing of a preselected overcurrent condition.

4,695,918

PRE-INSERTION INDUCTOR ARRANGEMENT

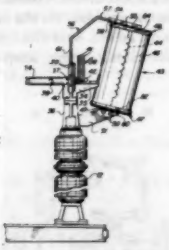
Raymond P. O'Leary, Evanston, Ill., assignor to S&C Electric Company, Chicago, Ill.

Filed Jul. 24, 1986, Ser. No. 890,425

Int. Cl.[4] H01H *33/16*

U.S. Cl. 361—58 **19 Claims**

1. A pre-insertion inductor arrangement utilized with a high voltage switch and being inserted into a circuit having an applied source voltage and source frequency to limit the transient inrush current and/or voltages in the circuit during closure of the switch, the pre-insertion inductor arrangement comprising a pre-insertion inductor and means for inserting



said pre-insertion inductor for a plurality of cycles of the source frequency during closure of the switch.

4,695,919

CIRCUIT ARRANGEMENT FOR PROTECTION AGAINST SURGE VOLTAGES FOR A REPEATER

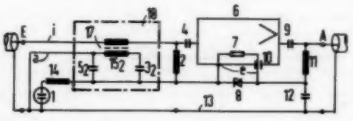
Peter Wendt, Augsburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 26, 1985, Ser. No. 716,091

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411942

Int. Cl.[4] H02H *1/04*

U.S. Cl. 361—110 **9 Claims**



1. A circuit arrangement which protects against coarse surge voltages at a repeater between incoming and outgoing coaxial cables each including an inner conductor and an outer conductor, said arrangement comprising: an intermediate coaxial cable means including an inner

conductor and an outer conductor means, an input terminal connecting said inner conductor of said intermediate cable means to said inner conductor of said incoming coaxial cable and first and secind output terminals respectively connecting said inner conductor of said intermediate cable means to said inner conductor of said outgoing coaxial cable and said outer conductor means of said intermediate cable means to said outer conductor of said outgoing coaxial cable;

a pair of current supply separating filters respectively connected between said input and output terminals and said outer conductor means of said intermediate coaxial cable means;

a surge voltage arrester which protects against coarse surge voltages;

a remote current feed path including said inner conductor of said intermediate coaxial cable means including said current supply separating filters;

each of said current supply separating filters comprising an inductor connected to said input and first output terminals, respectively;

a connection between said inductors; and

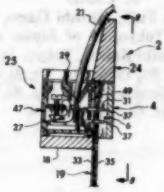
a series circuit including said surge voltage arrester, an inductor, a low-pass filter connecting said series circuit to said connection between the outer conductors of said incoming and outgoing cables.

4,695,920

ISOTHERMAL CAVITY AND SPARK GAP PROTECTION ASSEMBLY FOR INPUT/OUTPUT CONNECTION TERMINALS FOR ELECTRONIC MODULES

John M. Klebba, Golden, and Kenneth L. Hultman, Louisville, both of Colo., assignors to Geomation, Inc., Golden, Colo.

Filed Aug. 14, 1986, Ser. No. 896,628
Int. Cl.[4] H02H 3/20
U.S. Cl. 361—118 45 Claims



1. In combination with a printed circuit board having a substantially planar, card member with first and second end portions spaced from each other along a first axis and with a printed circuit thereon, and a terminal pin connector panel having a plurality of input and output pins extending along respective axes, said panel being positioned adjacent the first end portion of said card member with the pins of the panel electrically connected to portions of said printed circuit and the respective pin axes substantially perpendicular to the plane of said card member, each of said pins having a free standing end spaced from the plane of said card member, the improvement comprising apparatus for forming an isothermal cavity about said panel and a spark gap of least impedance at the free standing end of each pin, said apparatus including:

isothermal means substantially surrounding said panel to create an isothermal cavity about said panel, said isothermal means having high thermal conducting properties and having a portion thereof positioned immediately adjacent said panel in substantially an abutting relationship therewith, said portion further being positioned substantially between said panel and the second end portion of said card member and

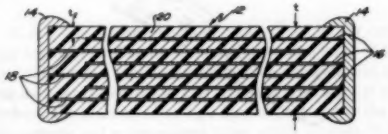
spark gap means positioned adjacent the free standing ends of said pins to present a path of least impedance between each of said pins and said spark gap means for discharging any high potential voltages in each pin above a predetermined amount.

4,695,921

FILM CHIP CAPACITOR

William L. Robbins, Newton Center, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 4, 1985, Ser. No. 794,984
Int. Cl.[4] H01G 1/13, 4/08
U.S. Cl. 361—308 2 Claims



1. A film chip capacitor for micro-electronic printed circuit boards, comprising:

a plurality of flat, parallel, rectangular, organic dielectric films, each said film having a first and second end, each said film being of preselected length "l" and width "w", each said film having a thickness t/not exceeding 3 mils and wherein said dielectric film is an organic material containing ceramic particles;

a first plurality of flat, parallel, rectangular aluminum electrodes, having interposed therebetween two each of said plurality of dielectric films, each said first electrode having a preselected thickness and further having a width equal to "w" and a length <"l" of said dielectric film, each said electrode having one end of width "w" aligned with said first ends of said dielectric films;

a second plurality of flat, parallel, rectangular aluminum electrodes, having interposed therebetween two each of said plurality of dielectric films and one each of said first electrodes, each said second electrode having a preselected thickness equal to said first electrodes and further having a width equal to "w" and a length <"l" of said dielectric film, each said electrode having one end of width "w" aligned with said second ends of said dielectric films thereby forming a rectangular block having a first end and a second end, said block further having a top and a bottom, said dielectric film forming the outer surfaces thereof, the surfaces of adjacent dielectric films and electrodes being bonded together using bonding agents selected to provide the mechanical stability of said block;

a first aluminum end cap means, perpendicular to and conductively attached to each of said first electrodes at said first block end for providing electrical mounting and conducting means to said printed circuit board; and

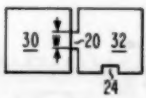
a second aluminum end cap means, perpendicular to and conductively attached to each of said second electrodes at said second block ends for providing electrical mounting and conducting means to said printed circuit board.

4,695,922

CONSTANT RATIO, SIZE INSENSITIVE, CAPACITOR STRUCTURE

John A. Olmstead, Branchburgh Township, Somerset County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 3, 1986, Ser. No. 925,982
Int. Cl.[4] H01G 4/38
U.S. Cl. 361—329 6 Claims



1. In an integrated circuit device, a pair of matched capacitors each of which comprises at least one of a unit capacitor and a first subcapacitor having a top plate, a bottom plate, and a layer of dielectric material therebetween, wherein at least said top plate of said first subcapacitor includes a rectangularly shaped tab having a width W, said tab projecting outwardly from a side of said subcapacitor for a distance substantially equal to one half W, and a rectangularly shaped opening in a side of said subcapacitor having a width substantially equal to W and extending inwardly from said side for a distance substantially equal to one half W, wherein said unit capacitor abuts said tab along its entire width W.

4,695,923

PRINTED CIRCUIT BOARD BOLT-ON POWER DISTRIBUTION SYSTEM

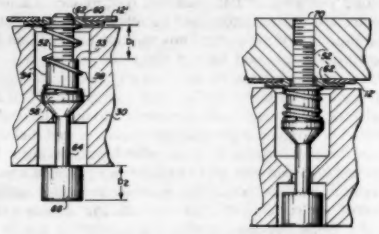
Ronald F. Abraham, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed Aug. 28, 1986, Ser. No. 901,235
Int. Cl.[4] H02B 1/20
U.S. Cl. 361—361 4 Claims

1. An apparatus for connecting a first element to a second element, the second element having a hole, such that a minimum predetermined force exists at the connection between

said first element and said second element, said apparatus comprising:

(a) shaft means, having a first, second, and third diameter along the axis of said shaft means, forming a first, second, and third shaft, respectively, said first diameter being the smallest diameter and said third diameter being the largest diameter, said first shaft being threaded, for mating with said second element; and



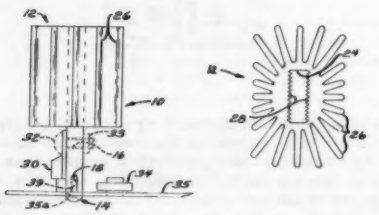
(b) spring means, having an inside diameter smaller than the diameter of said third shaft and having a length approximately equal to the length of the first and second shaft, coaxially positioned over said first and second shaft, and when said first element is placed in contact with said second element, for applying a minimum predetermined force between said first and second element when said first shaft is inserted into the hole of said second element to the point where the base of said second shaft contacts the surface of said first element.

4,695,924

TWO PIECE HEAT SINK WITH SERRATED COUPLING

George Wozniczka, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Jul. 17, 1986, Ser. No. 887,147
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—386 **10 Claims**



1. For mounting on a printed circuit (PC) board, a heat sink comprising:

a generally linear, elongated first member having a longitudinal axis and first and second end portions and comprised of a high thermal conductivity material, wherein said first member is tapered in proceeding from the first to the second end portion thereof and the first end portion thereof includes mounting means for securely mounting said first member to a printed circuit board; and

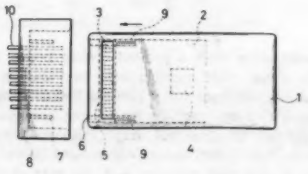
a second member comprised of a high thermal conductivity material and including a plurality of spaced, generally planar fins disposed on the periphery thereof and aligned along the longitudinal axis of said first member, said second member having an aperture therein adapted to receive the second end of said first member in tight fitting relation, wherein said aperture is defined around the periphery thereof by a plurality of serrations which are adapted for deformation upon contact with said first member when the second end of said first member is inserted under pressure into the aperture of said second member, whereupon intimate engagement and high thermal conductivity is established between said first and second members.

4,695,925

IC CARD

Syojiro Kodai; Noriaki Fujii; Hiroshi Gamo, all of Itami, and Bujirou Kobayashi, Tokyo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1986, Ser. No. 913,365
Claims priority, application Japan, Sep. 30, 1985, 60-218624
Int. Cl.[4] H05K *1/14*
U.S. Cl. 361—395 **6 Claims**



1. An IC card used for conducting a transfer of information through a connector to a card reading out device, said card being provided with electrode terminals for connection to the outside, said card comprises:

a slidable shutter within said card for covering said electrode terminals in a usual state;

a hole provided at a front portion of said card, said hole receives a projection provided at said connector when said card is inserted into said connector; and

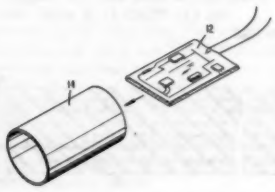
said shutter being retreated when said projection of said connector comes into contact therewith thereby exposing said electrode terminals when said card in inserted into said connector.

4,695,926

ENCAPSULATION AND INSULATION OF ELECTRONIC CIRCUIT BOARD STRUCTURES

Michael G. McDermott, Glenside, Pa., assignor to Bell of Pennsylvania, Conshohocken, Pa.

Filed Jul. 1, 1986, Ser. No. 881,172
Int. Cl.[4] H05K *1/14*
U.S. Cl. 361—395 **7 Claims**



1. An electronic circuit board structure, comprising:

circuit board for mounting electronic components thereon, and

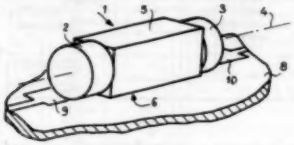
a heat shrink tubing layer enclosing the circuit board, whereby wiring patterns and any components mounted on said circuit board are insulated from moisture.

4,695,927

PACKAGE FOR A SURFACE MOUNTABLE COMPONENT

Lucien Barre, Tours, France, assignor to Thomson-CSF, Paris, France

Filed Jul. 11, 1986, Ser. No. 884,493
Claims priority, application France, Jul. 12, 1985, 85 10720
Int. Cl.[4] H05K 1/11
U.S. Cl. 361—400 2 Claims



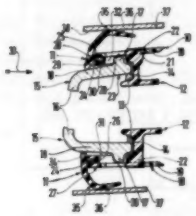
1. An electrical component comprising two cylindrical exposed conductive end caps extending along a common axis, and a plastic body between said end caps, said body having a substantially planar upper face and a substantially planar lower face, said upper and lower faces being separated by a distance which is slightly smaller than the diameter of said end caps so that a layer of glue may be placed between the body and a printed circuit when the component is placed on such a circuit board with its end caps in contact with the printed circuit board.

4,695,928

FRAME FOR HEADLIGHTS OF MOTOR VEHICLES

Friedrich Schauwecker, Pfullingen, and Walter Weber, Reisensburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 29, 1986, Ser. No. 893,891
Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531220
Int. Cl.[4] B60Q 1/00
U.S. Cl. 362—61 7 Claims



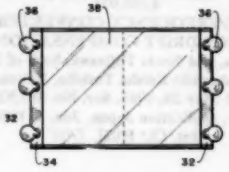
1. A frame for headlights of motor vehicles for covering a gap between a reflector of a headlight and a body of the vehicle, the frame comprising a connection member, and a screening member connected to said connection member in a locking fashion, the headlight having a housing secured to the body of the vehicle and a transparent pane which extends through an opening in the body of the vehicle, said connection member having a plurality of openings (20) each forming a shoulder (21), the housing of the headlight having a plurality of projections (22) extending inwardly from said transparent pane (15) whereby, upon the insertion of the frame into its functional position in the body of the vehicle, each shoulder engages with a respective projection.

4,695,929

OMNI-DIRECTIONAL DISPLAY DEVICE

Charles Smith, 8509 Lennox Ave., Panorama City, Calif. 91402

Filed Mar. 14, 1985, Ser. No. 711,971
Int. Cl.[4] F21V 33/00
U.S. Cl. 362—140 4 Claims



1. A device for providing a reflected display of an object comprising;

a pair of front surface mirrors positioned with one respective edge of each in abutment; said mirrors being positioned at an angle of substantially ninety degrees to one another;

a third surface window-mirror positioned in abutment with the free edges of said-pair of front surface opposite the abuting ninty degree edges, said third mirror forming with said pair of a mirrors a right isosceles triangular polyhedron enclosure;

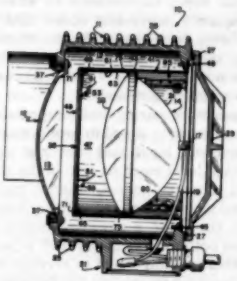
base mounting means for mounting said enclosure formed by said mirrors for viewing an object placed in said enclosure.

4,695,930

INFRARED FLOODLIGHT ASSEMBLY

Julian J. Wierzbicki, Peabody, and Kirti B. Chakrabarti, Danvers, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Oct. 3, 1985, Ser. No. 783,710
Int. Cl.[4] F21V 9/00
U.S. Cl. 362—293 14 Claims



1. An infrared floodlight assembly comprising:

a heat conductive housing including a forward opening and defining a chamber therein;

a lens member secured to said housing and providing a cover for said forward opening;

an infrared floodlight positioned within said chamber of said heat conductive housing for providing infrared radiation upon activation thereof; and

retention means located within said chamber of said heat conductive housing and including a heat conducting member for securedly retaining said floodlight therein in a spaced relationship from the internal walls of said housing and in an aligned manner relative to said lens member such that infrared radiation from said floodlight will be directed substantially toward said lens member, said heat

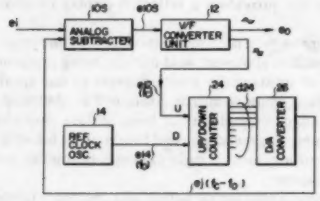
conducting member having an open end located adjacent said forward opening of said housing and defining a cavity therein, said floodlight being located within said cavity such that infrared radiation therefrom will pass through said open end.

4,695,931

VOLTAGE/FREQUENCY CONVERTER WITH FREQUENCY DRIFT COMPENSATION LOOP

Mitsuru Yamaura, and Norio Fujisawa, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 29, 1986, Ser. No. 867,929
Claims priority, application Japan, Jun. 3, 1985, 60-118778
Int. Cl.[4] H03L 7/00
U.S. Cl. 363—8 **22 Claims**



18. A voltage/frequency converter comprising:

voltage/frequency converter means for generating a voltage/frequency conversion output having a frequency corresponding to the potential of a voltage/frequency conversion input;

reference signal source means for generating a reference signal having a predetermined reference frequency;

counter means for providing a digital count output which corresponds to the difference between the number of oscillations of said voltage/frequency conversion output, obtained within a predetermined period of time, and the number of oscillations of said reference signal, obtained within said predetermined period of time, said digital count output being incremented by either one of said voltage/frequency conversion output and said reference signal and being decremented by the other;

digital/analog converter means for generating an analog compensation signal having a potential corresponding to said digital count output; and

signal mixer means for mixing said compensation signal with an a.c. converter input signal to produce said voltage/frequency conversion input, said converter input signal having an average level equal to zero in the absence of drift,

wherein said counter means, digital/analog converter means, signal mixer means and voltage/frequency conversion means constitute a negative feedback loop which compensates both for a frequncy drift of said voltage/frequency conversion output and an average level drift of the converter input signal so that the frequency of said voltage/frequency conversion output follows said reference frequency.

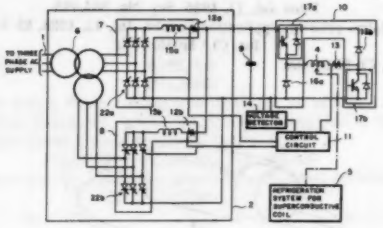
4,695,932

SUPERCONDUCTIVE ENERGY STORAGE CIRCUIT

Shigenori Higashino, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 25, 1986, Ser. No. 832,759
Claims priority, application Japan, May 15, 1985, 60-101436
Int. Cl.[4] H02M 7/00
U.S. Cl. 363—14 **6 Claims**

1. A superconductive energy storage circuit comprising an AC/DC converter circuit connected to an AC supply line and capable of controlling an output current, a DC capacitor connected between the terminals of the DC output of said AC/DC converter circuit, a chopper circuit connected in parallel to said DC capacitor, and a superconductive energy storage coil connected to the output of said chopper circuit, said AC/DC



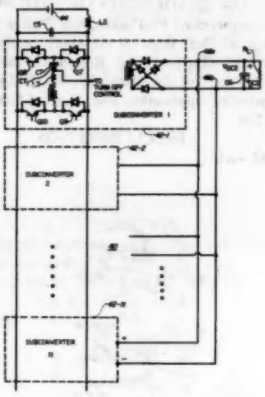
converter circuit having a current capacity selected to meet the electrical energy transferral requirements between said AC supply line and said superconductive energy storage coil.

4,695,933

MULTIPHASE DC-DC SERIES-RESONANT CONVERTER

Vietson M. Nguyen, Florissant, Mo.; P. John Dhyanchand, and Pierre Thollot, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Feb. 11, 1985, Ser. No. 700,449
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—17 **10 Claims**



1. A DC-DC converter for converting input DC power from a DC source into output DC power at a certain level, comprising:

a plurality of N successive DC-DC sine wave resonant subconverters each for converting the input DC power into a subconverter output having a ripple component at a particular frequency;

means for operating the N subconverters so that a phase displacement of $2\pi/N$ electrical degrees exists between output currents of successive subconverter outputs; and

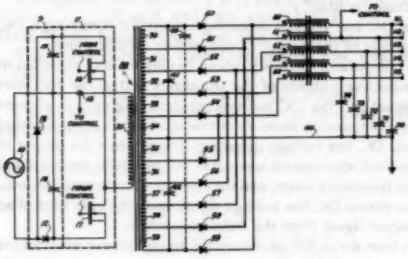
means for summing the subconverter outputs to develop output power having a ripple component at a frequency equal to N times the frequency of a subconverter output ripple component.

4,695,934

MULTIPLE OUTPUT RESONANT POWER SUPPLY

Robert L. Steigerwald, Scotia, N.Y., and Keku M. Mistry, Fort Walton Beach, Fla., assignors to General Electric Company, Schenectady, N.Y.

Filed May 13, 1985, Ser. No. 733,349
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—17 7 Claims



1. A multiple output resonant power supply comprising:

a transformer having a primary winding and multiple secondary windings, said secondary windings connected in series and having a tap between each pair of adjacently connected windings, one of the taps comprising a center tap and the remainder of the taps being equal in number on both sides of the center tap, said primary winding being wound on a single core and adapted to receive a variable frequency voltage, said multiple secondary windings being layered on said single core;

capacitive means including a pair of directly connected in series across said secondary windings, the junction of said pair of capacitors being connected to said center tap; and

a plurality of diodes each having its anode connected to a separate one of said remainder of the taps, respectively, the cathodes of said diodes being connected in pairs, the diodes of each of said pairs being connected to said secondary windings on opposite sides of said center tap;

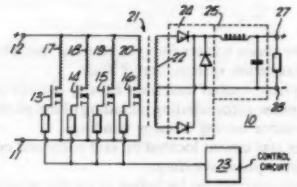
whereby a plurality of DC voltages are provided between said center tap and each of said diode pairs.

4,695,935

POWER SUPPLY

Sverre Oen, Oslo; Dag Poppe, Kolsas, and Sverre N. Tronsli, Nittedal, all of Norway, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 27, 1986, Ser. No. 879,686
Claims priority, application Norway, Jun. 28, 1985, 852598
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—21 8 Claims



1. A power supply comprising:

a DC/DC converter including

at least two transistors connected in parallel, each having low drain-source resistance;

a control circuit connected to each of said transistors to control the conductive state thereof, said transistors being controlled in parallel by a common control signal from said control circuit and exhibiting corresponding intervals of conduction, each of said transistors having output terminals; and

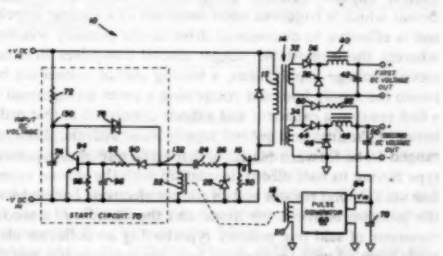
a transformer coupler including similarly wound primary windings constituted by a plurality of windings interconnected with said output terminals.

4,695,936

SWITCHING MODE POWER SUPPLY START CIRCUIT

Rex W. J. Whittle, Kowloon, Hong Kong, assignor to Astec Components, Ltd., Santa Clara, Calif.

Filed Feb. 7, 1986, Ser. No. 827,808
Int. Cl.[4] H02M 3/335
U.S. Cl. 363—21 17 Claims



1. In a DC/DC converter power supply including a DC voltage source, a power transformer including a primary winding and a secondary winding, rectifier and filter means connected to said secondary winding for generating an output DC voltage from the current output by said secondary winding, pulse generator means for generating a train of pulses of varying pulse width as a function of the present value of said output voltage, switch means coupled to said primary winding such that when said switch means closes, said DC voltage source is coupled across said primary winding, means for coupling said train of pulses to said switch means, said pulses causing said switch means to close for the duration of each said pulse, the improvement comprising start means responsive to the initiation of said DC voltage source for starting the operation of said pulse generator means, said start means including:

relaxation oscillator means connected to said DC voltage source for periodically generating a start pulse at a predetermined frequency;

means for coupling said start pulse to said switch means, said start pulse causing said switch means to close for a predetermined duration; and

means connected to said secondary winding for powering said pulse generator means, said powering means including energy storage means; means for coupling an incremental amount of energy to said storage means each time said start pulse is generated; means for detecting when sufficient energy is stored in said storage means to enable initial operation of said pulse generator means; means responsive to said detecting means for coupling said stored energy to said pulse generator means; and means for coupling ongoing power to said pulse generator means once said pulse generator means begins operation.

4,695,937

POWER SUPPLIES

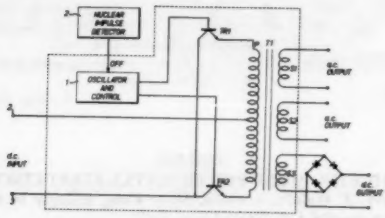
Philip R. Verity, Addlestone, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Feb. 29, 1984, Ser. No. 584,627

Claims priority, application United Kingdom, Mar. 1, 1983, 8305645

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—25 **13 Claims**



1. A switch mode power supply comprising an oscillator arranged to drive the primary winding of a transformer and a nuclear impulse detector comprising a monostable trigger circuit which is triggered upon detection of a nuclear impulse and is effective to discontinue drive to the primary winding, wherein the monostable trigger circuit comprises first and second voltage supply lines, a biasing circuit connected between the supply lines and comprising a series arrangement of a first resistor, a capacitor and a diode connected in that order between the first and second supply lines with the diode arranged to be forward biased, a first transistor of one polarity type having its base electrode coupled with the second supply line via a second resistor and its emitter electrode coupled with the junction between the diode and the capacitor, a second transistor of said one polarity type having its collector electrode coupled with the junction between the capacitor and the first resistor and its emitter electrode coupled with the second supply line, a third transistor of opposite polarity type having its base electrode coupled with the collector electrode of the first transistor via a first resistive means, its emitter electrode coupled with the first supply line and its collector electrode coupled with the base electrode of the second transistor via a second resistive means.

4,695,938

INVERTER CONTROLLING METHOD

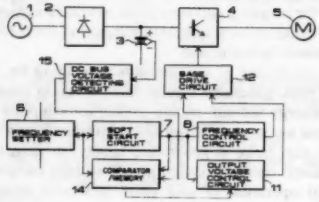
Hideaki Tada, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1985, Ser. No. 751,547

Claims priority, application Japan, Jul. 5, 1984, 59-137877

Int. Cl.[4] H02M *5/45*

U.S. Cl. 363—37 **4 Claims**



4. An inverter apparatus for driving an AC motor comprising:

(a) a power rectifier for converting an AC voltage of a commercial AC power supply to a DC voltage;

(b) a power inverter for converting said DC voltage to an AC voltage of a variable frequency and a variable voltage to drive said AC motor;

(c) a frequency setter which produces a voltage corresponding to a desired frequency condition of said inverter;

(d) a soft start circuit connected to the frequency setter for producing an output frequency control signal which increases gradually;

(e) a DC bus voltage detecting circuit for detecting a DC voltage of the output of said power rectifier; and

(f) a comparator/memory circuit having inputs connected to respective outputs of the frequency setter, the soft start circuit and the DC bus voltage detecting circuit wherein the comparator/memory circuit stores the output signal of said DC bus voltage detecting circuit when the output of said soft start circuit is equal in magnitude to the output of the frequency setter, and the comparator/memory outputs the stored DC bus voltage signal upon the next start of an output signal from the frequency setter;

(g) a base drive circuit connected to said power inverter for operating the power inverter;

(h) a frequency control circuit having an input connected to the output of the soft start circuit and having an output connected to a frequency control input of said base drive circuit; and

(i) an output voltage control circuit having respective inputs connected to the output of the soft start circuit and the output of the comparator/memory circuit and having an output connected to a voltage control input of said base drive circuit for producing a corrected voltage control signal in conformity to the AC power supply.

4,695,939

THREE-PHASE EXCITER FOR SYNCHRONOUS MACHINES

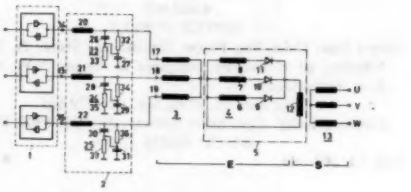
Muzaffer Canay, Birr, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed May 29, 1986, Ser. No. 868,059

Claims priority, application Switzerland, Jul. 4, 1985, 2888/85

Int. Cl.[4] H02J *3/01;* **H02K** *19/00*

U.S. Cl. 363—39 **11 Claims**



1. A three-phase exciter for synchronous machines having a brushless excitation system, comprising:

a three-phase exciter machine having a rotor including a multi-phase rotor winding including plural phase windings, and a stator having a stator winding;

a rectifier star circuit located on said rotor and connected to said rotor phase windings;

a synchronous machine including an exciter winding which is fed by said rectifier star circuit;

a three-phase source for feeding power to said three-phase exciter machine, including a three-phase power controller having a three-phase input connected to a three-phase power source, and a three-phase output for feeding a three-phase output current; and

a protection circuit having a low-pass characteristic connect-

ed between the three-phase output of said power controller and said stator winding of the three-phase exciter machine for protecting said rectifier star circuit, said protection circuit bypassing high frequency currents developed in said three-phase source and said stator of the exciting machine in order to reduce interaction between stator and rotor harmonics.

4,695,940

DYNAMIC FREQUENCY DIVIDER WITH A MIXER STAGE AND AN AMPLIFIER

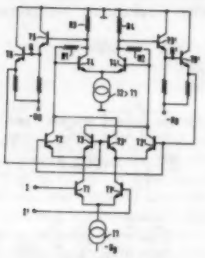
Hans-Martin Rein, Witten, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Mar. 4, 1986, Ser. No. 835,988

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509327

Int. Cl.[4] H02M *5/00*

U.S. Cl. 363—157 **7 Claims**



1. A dynamic frequency divider for producing a signal having a frequency f from a signal having a frequency 2f, comprising: a mixer stage having first and second inputs and an output, said first input receiving a signal of frequency 2f; and a transimpedance amplifier having an input connected to the output of said mixer stage and an output connected to the second input of said mixer stage for feeding back to said mixer stage a signal of frequency f.

4,695,941

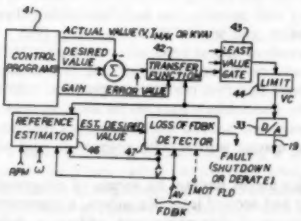
LOSS OF ELECTRICAL FEEDBACK DETECTOR

Ajith K. Kumar, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Jul. 29, 1985, Ser. No. 760,204

Int. Cl.[4] G05B *13/02*

U.S. Cl. 364—165 **17 Claims**



1. In a controller for a system which includes means for supplying a controllable amount of electric power to an electric load circuit, means for deriving at least first, second and third feedback signals that are representative, respectively, of certain system quantities, and means associated with the power supplying means for varying the amount of power supplied to the load circuit as a function of the value of a variable control signal produced by the controller in selective response to the feedback signals and to a given command signal, improved means for detecting the loss of a feedback signal, comprising:

a. first means for periodically estimating the desired value of a predetermined system quantity that is represented by the first feedback signal;

b. second means associated with said first means and responsive to said first feedback signal for finding the difference between the estimated desired value of said predetermined quantity and the actual value thereof as indicated by said first feedback signal;

c. third means for providing a biased error value equal to said difference value plus or minus a predetermined bias value;

d. integrating means associated with said third means for providing a resultant value that is representative of the time integral of said biased error value;

e. polarity detecting means associated with both said third means and said integrating means for periodically causing said bias value to be added to said difference value if the polarity of said resultant value is negative and for periodically causing said bais value to be subtracted from said difference value if the polarity of said resultant value is positive; and

f. level detecting means responsive to said resultant value for signaling the loss of said first feedback signal if the magnitude of said resultant value exceeds a predetermined threshold.

4,695,942

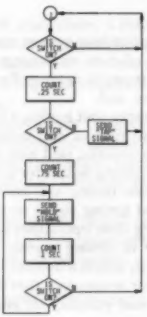
MANUAL SWITCH FOR ALTERING A PARAMETER IN OPPOSITE DIRECTIONS BASED ON LENGTH OF TIME OF SWITCH ACTUATION

Michael R. Levine; James T. Russo; Anthony C. Cairo, and Victor H. Rigotti, all of Ann Arbor, Mich., assignors to Honeywell Inc., Minneapolis, Mich.

Division of Ser. No. 709,918, Mar. 8, 1985, Pat. No. 4,606,401. This application Aug. 7, 1986, Ser. No. 894,296

Int. Cl.[4] G06F *15/00*

U.S. Cl. 364—188 **14 Claims**



1. In a device including a programmable memory and one or more two-state manual input means for loading said memory with a desired value for a multivalue parameter having a given initial value, the improvement comprising:

function control means operable to adjust the initial value of the multivalue parameter in one direction if the program input means is maintained in a preselected state for a period of time less than a specified period of time and adjust that multivalue parameter in the opposite direction if the program input means is maintained in the preselected state for a period of time greater than a specified period of time.

4,695,943

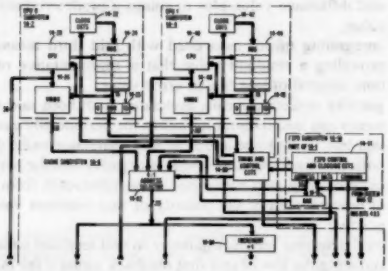
MULTIPROCESSOR SHARED PIPELINE CACHE MEMORY WITH SPLIT CYCLE AND CONCURRENT UTILIZATION

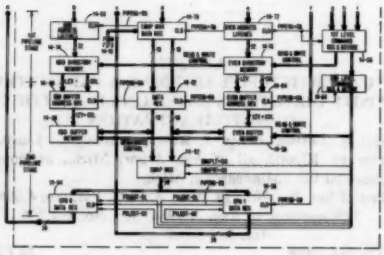
James W. Keeley, Hudson, N.H., and Thomas F. Joyce, Westford, Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Sep. 27, 1984, Ser. No. 655,473

Int. Cl.[4] G06F *13/00*; G11C *7/00*

U.S. Cl. 364—200 **33 Claims**





1. A data processing system comprising:

a plurality of data requesting sources, each operative to generate memory requests for data, each request including an address; and,

a cache memory unit having a number of pipeline stages and coupled to receive said memory requests from said data requestng sources, said unit including:

timing and control means for generating sequences of timing signals, said timing and control means being coupled to apply said timing signal to each of said sources for synchronizing their operations with said cache unit, said each sequence of timing signals defining a number of time intervals in which a different one of said intervals is preallocated for access to a first one of said pipeline stages by each of said plurality of said sources for receiving said requests;

a first one of said pipeline cache stages being coupled to said sorces and to said timing and control means to receive phase control signals from said timing and control means generated in response to a request being received from one of said sources during a preallocated interval, said first pipeline stage being enabled by said phase control signals to generate information signals during a following one of said time intervals for accessing said requested data specified by said request address when stored in said cache memory unit; and,

a second one of said pipeline cache stage being coupled to receive said phase control signals from said timing and control means, to said first pipeline stage and to said sources, said second pipeline stage being conditioned by said phase control signals to receive said information signals and access the designated data during a following another one of said time intervals for transfer to the requesting source thereby enabling the conflict-free concurrent processing of requests from said plurality of data requesting sources such that a first data requesting source can be utilizing the first pipeline stage while another data requesting source is utilizing the second pipeline stage.

4,695,944

COMPUTER SYSTEM COMPRISING A DATA, ADDRESS AND CONTROL SIGNAL BUS WHICH COMPRISES A LEFT BUS AND A RIGHT BUS

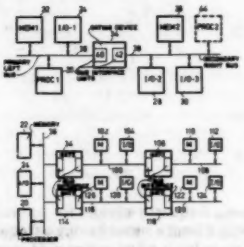
Frederik Zandveld, and Jeroen M. Visser, both of Beekbergen, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 495,379, May 17, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 910,796

Claims priority, application Netherlands, May 19, 1982, 8202060

Int. Cl.[4] G06F *13/14, 13/38*

U.S. Cl. 364—200 **7 Claims**



1. A computer system having a primary processor station (**20**) and a first random access read-write memory (**22**) having a first address space interconnected by a primary bus (**36**) for data, address signals and control signals;

said primary processor station having intercommunicating means for communicating sequentially a request signal from a prospective master station (BUSRN), then a bus allocation signal (MSN), then a "bus occupied" signal from said primary processor station (BSYN) and thereafter data signals, addres signals, master handshake signals (TMRN, TMPN) and slave handshake signals (TSMN) between an actual master station and an actual station accessed by said master station;

coupler means (**34**) having first interface mans (**40**) for interfacing to said primary bus and functioning thereto as a slave station, and second interface means (**42**);

a second random access read-write memory (**24**) having a second address space outside of said first address space, and at least one first peripheral apparatus (**28**) interconnected by a secondary bus (**38**) for data, address and control signals, said second interface means functioning as a potential master station with respect to said secondary bus;

said coupler means having, by means of inteconnection of said first and second interface means, a transmitting state for exchange of data characters, addresses, data request signals, data acknowledge signals and control signals between said primary bus and said secondary bus for executing an information exchange between a master station on said primary bus and a slave station on said secondary bus; characterized in that:

said coupler means having static deadlock preventing means comprising unidirectionally transmitting means for transmitting initiating request signals exclusively from said primary bus to said secondary bus while blocking any

transfer initiation requst signals generated by a station connected to said secondary bus;

said coupler means having alternatively to said transmitting state a non-transmitting state for allowing the coexistnece of a request on said primary bus and also data transfer between at least two stations on said secondary bus;

said second interface means for operating in a bus controller state for said secondary bus in absence of a further processor station on said secondary bus having allocation control means for exclusively controlling said secondary bus under control of a request signal (BUSRN) from said primary bus to the secondary bus; said allocation control means having first signalling means for generating on a first bus wire a secondary bus request signal (BUSRN), second signalling means for generating on a second bus wire a secondary bus "master selected" (MSN) signal, third signalling means on a third bus wire for generating a secondary "bus occupied" signal (BSYN), fourth signalling means for generating on a fourth bus wire secondary master handshake signals (TMRN, TMPN) under the control of master handshake signals from said primary bus after allocating said secondary bus to a request signal from said primary bus; and

gating means under the control of a secondary bus slave handshake signal (TSMN) on a fifth bus wire for gating slave handshake signals (TSMN) from said secondary bus to said primary bus;

said second interface means having an alternative state to said bus controller state for operating upon presence of said further processor station on the secondary bus for relinquishing control of the "bus occupied" signal to said further processor while retaining control of said other bus allocation control and bus handshake signals; and

said coupler means are also transmissive for a start signal emanated from the primary processor station for a peripheral apparatus connected to said secondary bus and also for an interrupt signal from a peripheral connected to said secondary bus to said primary processor station.

4,695,945

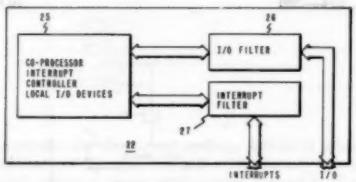
PROCESSOR I/O AND INTERRUPT FILTERS ALLOWING A CO-PROCESSOR TO RUN SOFTWARE UNKNOWN TO THE MAIN PROCESSOR

John W. Irwin, Georgetown, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1985, Ser. No. 706,802

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **20 Claims**



1. In a data processing system including a main processor and at least one input/output device connected to a bus, the improvement for configuring said system to allow the addition of a co-processor to operate concurrently with said main processor and selectively sharing utilization of said input/output device, comprising:

means dynamically controlled by said main processor for selectively preventing direct access to said input/output device in response to an attempted access by said co-processor;

means connected to said means for selectively preventing for utilizing said main processor to service said attempted access of said input/output device by said co-processor when said means for selectively preventing has been enabled to prevent direct access to said input/output device by said co-processor; and

said means for selectively preventing and said main processor allowing concurrent utilization of said input/output device by said main processor and co-processor when said means for selectively preventing has not been enabled.

4,695,946

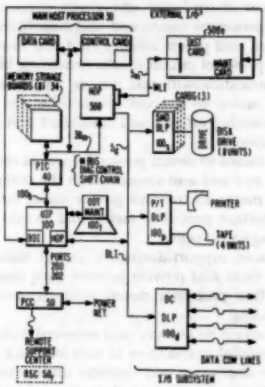
MAINTENANCE SUBSYSTEM FOR COMPUTER NETWORK INCLUDING POWER CONTROL AND REMOTE DIAGNOSTIC CENTER

David A. Andreasen, Newton Square, Pa.; John H. Armstrong, Laguna Niguel, Calif.; Jerrold E. Buggert, San Juan Capistrano, Calif.; Harshad K. Desai, Mission Viejo, Calif.; Stephen D. Baumgardner, El Toro, Calif.; Kenneth E. Buckmaster, Maidenhead, England, and Zubair Hussain, Sunnyvale, Calif., assignors to Unisys Corporation, Detroit, Mich.

Filed Oct. 25, 1984, Ser. No. 664,670

Int. Cl.[4] G06F *11/22*

U.S. Cl. 364—200 **14 Claims**



1. In a computer network comprising a host computer and I/O subsystem connected to remote peripheral units via data link processors and also connected to a maintenance subsytem for initialization, testing and diagnostic operations, the maintenance subystem comprising:

(a) user interface processor means connected to said host computer and I/O subsystem and having further connections to a remote support-diagnostic center via a power control card unit, said user interface processor means including:

(a1) means to control the power on/off condition of any connected unit in the said computer network;

(a2) means to initiate self-test operations within said interface processor means;

(a3) means to initiate self-test routines in said data link processors;

(a4) means to transmit/receive diagnostic information to/from a remote support-diagnostic center;

(a5) means to display data, instructions and diagnostic information on an operator display terminal;

(a6) and wherein said user interface processor means operates to detect and identify any card or module having:

(i) a power fault;

(ii) a logic fault;

(iii) memory unit failure;

(iv) peripheral device failure;

(v) an intermittent hardware or software failure;

(a7) dual function controller means providing mainte-

nance data transfer connections to said host computer and said data link processors, said dual function means including:

(a7a) means to execute maintenance data transfers to and from said data link processors while operating as a master to said data link processors;

(a7b) means to execute maintenance data transfers to and from said host computer while operating as a slave to said host computer;

(b) processor interface card unit means, connected to said main host computer and said I/O sybsystem, for providing a data transfer interface to said host computer and data link processors, said processor interface card unit means including:

(b1) interface means to said main host computer for data transfer operations;

(b2) means for storing a multi-word history trace of data resulting from a given input signal;

(b3) means for recording a series of events for analysis of operations;

(c) said operator display terminal, connected to said interface user processor means, for displaying data, instructions and diagnostic information to a human operator;

(d) power control card unit means, connected to said interface processor means and said remote support-diagnostic center, said power control card unit means including:

(d1) protocol circuit means providing bidirectional communication with said remote support center means;

(d2) means to execute instructions for powering on or powering off any said connected unit in said computer network;

(d3) means to detect power failures in the power modules of any said unit connected in the computer network;

(d4) means to transmit power status information to said interface processor means and to said remote support-diagnostic center;

(e) remote support-diagnostic center means for receiving data from said poweer control card unit means and said interface processor means, said diagnostic center means including:

(e1) means to analyze said received data and to generate remedial instructions to said interface processor means for display on said operator display terminal;

(e2) means to initiate and operate said user interface processor means for operation of those parts of the said host computer and I/O subsystem which are tested as operable.

4,695,947

VIRTUAL ADDRESS SYSTEM HAVING FIXED COMMON BUS CYCLES

Koichi Ikeda, Atsugi; Kozi Nakamura, and Toshihiro Okabe, both of Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 6, 1984, Ser. No. 577,497

Claims priority, application Japan, Feb. 28, 1983, 58-32573

Int. Cl.[4] G06F *12/10, 13/00*

U.S. Cl. 364—200 **3 Claims**

1. An information processing system comprising:

a processor unit;

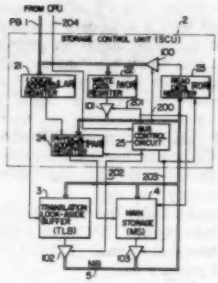
a main storage;

a storage control unit coupled between said processor unit and said main storage for controlling data-transferring operations between said processor unit and said main storage in response to receipt of a logical address from said processor unit, including a logical address register for storing said logical address received from said processor unit, a physical address register for storing a physical address to be supplied to said main storage for accessing said main storage, a write data register for storing data to be written in said main storage, and a read data register for storing data read from said main storage;

address translation means connected to said storage control unit for translating said logical address stored in said logical address register into a physical address; and

bus means connected to said main storage, said address translation means, said write data register, said read data register, and said physical address register for transferring data and addresses therebetween;

said storage control unit including bus control means for controlling said bus means in such a manner that at any time there is performed only one of two operations which consist of transferring a physical address obtained from



said address translation means to said physical address register and transferring data between said storage control unit and said main storage, said bus control means including means for controlling said bus means to effect transferring of a physical address obtained from said address translation means to said physical address register, transferring of data read from said main storage to said read data register and transferring of data stored in said write data register to said main storage through said bus means at selectively different times.

4,695,948

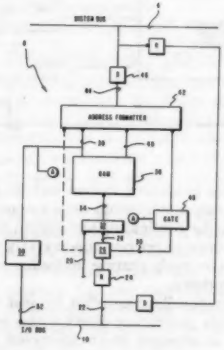
BUS TO BUS CONVERTER USING A RAM FOR MULTIPLE ADDRESS MAPPING

Ballard J. Blevins, Lexington, Ky.; William G. Kulpa, Austin, Tex.; Joseph R. Mathis, Georgetown, Tex., and John W. McCullough, Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 28, 1985, Ser. No. 706,734

Int. Cl.[4] G06F *12/10*

U.S. Cl. 364—200 **10 Claims**



1. An improved data processing system comprising a global system storage unit, a central processing unit, a system bus connecting the central processing unit and the global system

storage unit, a bus converter interfacing the system bus with an I/O bus, said I/O bus having a plurality of I/O ports, and means for connecting a plurality of randomly selected I/O devices respectively to said I/O ports and having one such I/O device so connected, the improvement in the bus converter comprising:

means connected to said I/O bus for partitioning I/O address fields which are transmitted from said I/O bus into a high order field and a low order field;

means connected to receive a DMA ID of said connected I/O device from said I/O bus and for combining the DMA ID of said I/O device with the high order field of said I/O address to form a first combined address;

means for accessing a RAM with said first combined address to obtain data containing

a control field and a prefix field and outputting the same;

an address formatter connected to receive said control field, said prefix field and said low order address field and for providing a second combined address from said prefix field , said lower order field and said control field; and

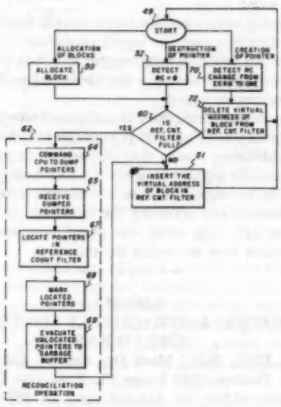
means connected to said address formatter for transmitting said second combined address onto said system bus.

4,695,949

METHOD FOR EFFICIENT SUPPORT FOR REFERENCE COUNTING

Satish Thatte, Richardson, and Donald W. Oxley, Carrollton, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 19, 1984, Ser. No. 632,564
Int. Cl.[4] G06F *12/02*
U.S. Cl. 364—200 **2 Claims**


START
ALLOCATION OF BLOCKS
DESTRUCTION OF POINTERS
CREATION OF POINTER
ALLOCATE BLOCK
DETECT RC = 0
DETECT RC CHANGE FROM ZERO TO ONE
IS REF. CNT. FILTER FULL?
DELETE VIRTUAL ADDRESS OF BLOCK FROM REF. CNT. FILTER
YES
NO
COMMAND CPU TO DUMP POINTERS
INSERT THE VIRTUAL ADDRESS OF BLOCK IN REF. CNT. FILTER
RECEIVE DUMPED POINTERS
LOCATE POINTERS IN REFERENCE COUNT FILTER
MARK LOCATED POINTERS
EVACUATE UNLOCATED POINTERS TO "GARBAGE BUFFER"
RECONCILIATION OPERATION

1. Apparatus for identifying garbage blocks in a block oriented memory of the type in which each memory block has an associated reference count representing a number of pointers to it from other memory blocks and itself, but not including pointers from a CPU, comprising:

means for creating a data structure for containing pointers to blocks of memory;

means for inserting in the data structure a pointer to each block of memory which has a reference count of zero;

means for deleting from the data structure the pointer to each block of memory whose reference count changes from zero;

means for comparing pointers in the CPU with the pointers in the data structure;

means for marking memory blocks which are in the data structure and not pointed to by the CPU as garbage blocks; and

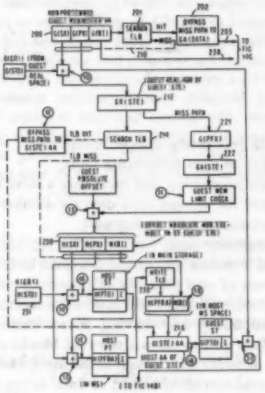
means for moving the pointers to memory blocks marked as garbage blocks from the data structure to a garbage buffer.

4,695,950

FAST TWO-LEVEL DYNAMIC ADDRESS TRANSLATION METHOD AND MEANS

Henry R. Brandt; Patrick M. Gannon, both of Poughkeepsie, N.Y.; Wan L. Leung, Coral Springs, Fla., and Timothy R. Marchini, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 17, 1984, Ser. No. 651,491
Int. Cl.[4] G06F *12/10*
U.S. Cl. 364—200 **10 Claims**



1. A method for obtaining dynamic address translation (DAT) for a nonpreferred guest (NPG) requested virtual address (VA) for guest requested data or instructions utilizing a translation lookaside buffer (TLB) for storing recent address translations, when a TLB miss occurs for a NPG requested VA, comprising the steps of:

sequencing hardware logic circuits to perform the DAT for the NPG requested VA by:

firstly generating a guest real (GR) segment table entry (STE) address by adding a guest segment table origin (STO) and a segment index (SX) field from the NPG requested VA, searching the TLB for the GR STE address,

having a TLB hit during the TLB search for the GR STE address, obtaining the translated GR STE address from the TLB, and bypassing sequencing steps available in the hardware logic circuits for generating a translation of the GR STE address,

secondly, accessing a guest STE with the translated GR STE address, obtaining a page table origin (PTO) field in the guest STE, adding a page index (PX) field of the NPG requested VA to the obtained PTO field to generate a GR address of a page table entry (GR PTE address), searching the TLB for the GR PTE address,

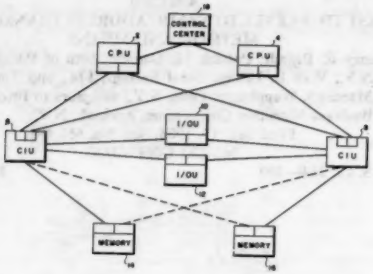
having a TLB hit during the TLB search for the GR PTE address, obtaining the translated GR PTE address from the TLB, and bypassing sequencing steps available in the hardware logic circuits for generating a translation of the GR PTE address.

4,695,951

COMPUTER HIERARCHY CONTROL

Lane K. Hooker, Phoenix; Thomas H. Howell, Scottsdale, and Charles W. Ferrell, Phoenix, all of Ariz., assignors to Honeywell Bull Inc., Phoenix, Ariz.

Filed Jul. 7, 1983, Ser. No. 511,616
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 3 Claims



1. A data processing system comprising:

a plurality of data processing units;

each such processing unit including a store into cache memory unit for storing data directly available for the use of the associated processing unit;

a main memory unit;

a central interface unit coupled to interface between individual ones of said plurality of processor units and between said processor units and said main memory unit;

each processing unit having access through said central interface unit to extract selected blocks of data from said main memory for storage in the associated cache memory unit, said extracted blocks of data, when modified by said processing units being returned for storage to the cache memory unit of the individual modifying processing unit wherein the latest modification of any modified block of data resides only in the cache unit of the modifying processing unit; and

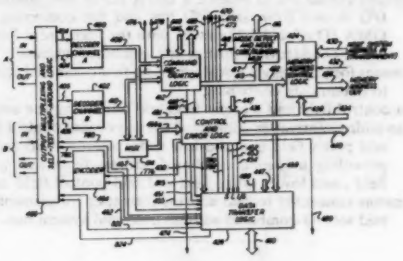
said central interface unit including means for producing control signals, a swap buffer means for storing blocks of data, there being a swap buffer means for each processor unit, and multiplexer means, said multiplexer means responsive to control signals produced by the central interface unit's means for producing control signals, for transmitting a block of data stored in any one swap buffer means directly to the cache memory unit of a data processing unit or to the main memory unit; said central interface unit responsive to a request signal from a requesting data processing unit requesting a given block of modified data stored in the cache unit of another data processing unit, hereinafter the possessor data processing unit, for causing the possessor data processing unit to transfer the given block of modified data from its cache unit to the swap buffer of the central interface unit associated with the possessor data processing unit, said central interface unit responsive to the storage of said given block of modified data in the swap buffer associated with the possessor data processing unit for causing the central interface unit's means for producing control signals to produce control signals causing the multiplexer means to transmit said given block of modified data stored in the swap buffer associated with the possessor data processing unit directly to the cache unit of the requesting data processing unit.

4,695,952

DUAL REDUNDANT BUS INTERFACE CIRCUIT ARCHITECTURE

Gary R. Howland, Granby, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jul. 30, 1984, Ser. No. 635,944
Int. Cl.[4] G06F *13/40*
U.S. Cl. 364—200 10 Claims



1. A bus interface circuit for transferring digital signals formatted as command, data, and status words between a signal processor having an associated memory and one of two redundant serial data buses, comprising:

control means responsive to both serial data buses for identifying and selecting one of the buses for transferring words between the memory and the identified and selected serial data bus according to the last bus to provide a valid command word;

data transfer means responsive to words from the selected serial data bus and the signal processor for transferring data, status and command words at a data port of the bus interface circuit between the identified and selected bus and the memory; and

addresing means, responsive to command words for addressing memory at an address port of the bus interface circuit, said addressing means also responsive to addressing signals from the signal processor for addressing the memory, whereby the signal processor is always granted access to the memory and whereby the interface circuit addresses the memory only when the signal processor is busy on tasks other than accessing the memory.

4,695,953

TV ANIMATION INTERACTIVELY CONTROLLED BY THE VIEWER

Preston E. Blair, 26212 Mesa Dr., Carmel, Calif. 93923, and Frank S. Preston, 3860 Dixon Pl., Palo Alto, Calif. 94306

Continuation of Ser. No. 526,464, Aug. 25, 1983, abandoned.
This application Apr. 14, 1986, Ser. No. 831,170
Int. Cl.[4] G06F *15/44*; G11B *31/00*; A63F *9/22*
U.S. Cl. 364—410 9 Claims

1. A video game system providing repeated switching of multiple tracks of different actions of the same animated character according to the skill of the operator in contacting the camera-originated animation display, comprising:

multiple tracks of animated motion picture production of different actions of the same character providing coded frames for track switching and coded location coordinates of said character target,

a video-audio input terminal providing means to operate multiple tracks of animation, providing for the switching thereof during operation, and providing for film track selection, masking, and centering to the full raster,

a player input terminal including a playing instrument deployed before the display with a transducer and a microphone combination mounted on the mutually perpendicular sides of the face of said monitor, providing means for producing digital signals representative of the two coordi-

nates of the location of said playing instrument with respect to the image on said monitor,

means of entering a table of values representing digital coordinates of the locations of animation targets per frame and means for entering episode cueing (cuing) data into memory storage at the start of the episode,

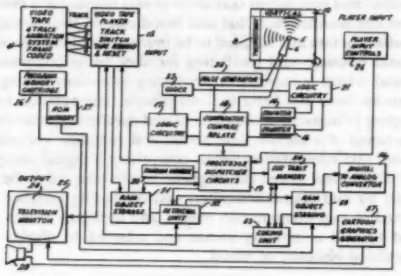
means of retrieval of said digital coordinates of the location of said target area at a designated frame from the memory storage,

means of comparing and matching the coodinates of the location of said playing instrument transducer to the coordinates of the location of said animated target area retrieved from said memory storage at a designated frame, to obtain the category of proximity,

means of processing and dispatching to effect the switching of multiple tracks of animation to the said video-audio terminal based on the said determined category of proximity obtained by the comparison of the location of said playing instrument transducer to animated target area and frame cueing from said memory storage,

continuing means of processing and dispatching for instructing said video-audio terminal to re-wind multiple tracks of animation to another episode determined by means of random choice or player input at the termination of an episode.

2. Apparatus as set forth in claim 1 as a primary circuit, and a secondary circuit providing digital animation, digital graphics and audio scoring the game and related to the game-



originated animation and player's actions, and controlling the progress of both primary and secondary circuits, comprising:

a second player input terminal providing means of system control for the said means of processing and dispatching,

permanent memory means providing a mass storage of digital graphics image data for a means to generate cartoon graphics for a video monitor display,

said means of retrieval retrieving said digital graphics image data from said permanent memory means for storage in a random access memory means,

said permanent memory providing storage of control data including cue commands, said cue commands comprising schedule commands for said processing and dispatching means,

said means of retrieval retrieving said control data from said permanent memory means for storage in said random access memory means, said permanent memory means storing audio and/or graphics data for a random access memory of object video staging,

said means of retrieval retrieving said audio and/or graphics data from said permanent memory means for said random access memory of object video staging,

said processing and dispatching means controlling the course of the digital animation,

a cue table memory means for storing cue commands from said processing and dispatching means,

a cueing unit repeatedly scanning said cue table memory means to get said cue commands, and to execute said cue commands,

said processing and dispatching means requesting successive blocks of control information from said means of retrieval for operations scheduling instructions for storage in said cue table memory means for use by said cueing unit - said processing and dispatching means repeatedly updating said operations scheduling instructions as the cartoon progresses,

said cueing unit executing cue commands at the times therein specified by conveying to the said means to generate cartoon graphics blocks of binary coded data from said means of retrieval from storage in said random-access memory of video staging, to generate cartoon frames for display on said video monitor,

program memory cartridge means for providing individual game data to reinforce said audio and/or graphics data stored in said random-access memory of object video staging,

said means of retrieval obtaining digital audio data from said permanent memory means for said randon-access memory of object video staging, to be sent to a means of converting digital data to analog form, and hence to a system speaker,

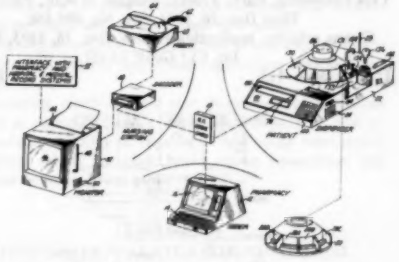
said processing and dispatching means controlling progress of the game involving said primary and secondary circuits using data from said program memory cartridge means, said permanent memory means obtained through said means of retrieval and said cueing unit, said means of processing and dispatching ordering said control information of the game for the primary circuit to be sent from said cueing unit to the video-audio input terminal.

4,695,954

MODULAR MEDICATION DISPENSING SYSTEM AND APPARATUS UTILIZING PORTABLE MEMORY DEVICE

Robert J. Rose, 201 East First, Park Rapids, Minn. 56470, and Russell L. Trimble, 70 Carriage Lane, Burnsville, Minn. 55337

Filed Oct. 31, 1984, Ser. No. 663,916
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—413 **45 Claims**



1. A modular system for distributing and dispensing medications, including:

portable memory means for storing data representative of patient medication dispensing information and capable of use with other elements of the system including programming means, dispenser means and monitor means;

programming means, including means for releasably receiving the portable memory means, for receiving medication dispensing information and for writing data representative of the medication dispensing information to the portable memory means;

dispenser means for dispensing prescribed medications, the dispenser means including:

memory receiving means for releasably receiving the portable memory means to which data representative of

the medication dispensing information has been written through use of the programming means;

read means for reading the data representative of the medication dispensing information from the portable memory means when the portable memory means is positioned in the memory receiving means;

container means having a plurality of individual compartments for storing prescribed medications;

control means coupled to the read means for providing control signals as a function of the data representative of the medication dispensing information;

access means coupled to the control means and responsive to the control signals for making the prescribed medications within individual compartments of the container means accessible to a patient at prescribed times in accordance with the data representative of the medication dispensing information;

sensor means for sensing patient compliance information representative of whether the prescribed medications were accessed by the patient when made accessible by the access means;

write means coupled to the sensor means for writing data representative of the patient compliance information to the portable memory means when the portable memory means is positioned in the memory receiving means; and

monitor means, including memory receiving means for releasably receiving the portable memory means, for providing a display of the medication dispensing information and the patient compliance information stored by the portable memory means; wherein the programming means, dispenser means and monitor means can be positioned at locations remote from each other.

4,695,955

ELECTRONIC DEVICE PROVIDING A UNIVERSAL INTERFACE BETWEEN SENSORS AND AN ACQUISITION AND PROCESSING UNIT OF THE SIGNALS ORIGINATING FROM SAID SENSORS

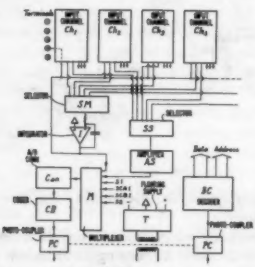
Yves Faisandier, Paris, France, assignor to A2F, Paris, France

Filed Dec. 26, 1984, Ser. No. 686,450

Claims priority, application France, Dec. 26, 1983, 83 20770

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—413 **10 Claims**



1. An electronic device providing a universal interface between sensors and an acquisition and processing system of the signals originating from the sensors, wherein the various sensors are connected to standardized terminals, appearing all identical to the user and comprising energization and amplifying elements, capable of being adapted to said sensors, and identification means for automatically recognizing the sensor present in the terminal, so as to allow for programming of the signal amplification, energization and processing elements.

4,695,956

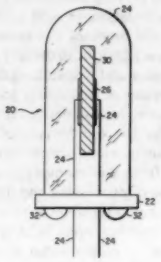
APPARATUS AND METHOD OF QUANTIFYING HEMOSTASIS USING OSCILLATIONS FROM A TRANSDUCER IMMERSED IN THE BLOOD SAMPLE

Eric G. LeVeen, 321 Confederate Cir., Charleston, S.C. 29407, and Robert F. LeVeen, 312 Lombard St., Philadelphia, Pa. 19147

Filed Nov. 1, 1984, Ser. No. 667,007

Int. Cl.[4] G06F *15/42*

U.S. Cl. 364—416 **9 Claims**



1. An apparatus for measuring blood viscosity changes during coagulation comprising, in combination: a housing of known volume adapted to receive blood therein; an oscillating member and post means contained in said housing at a distance from one another such that said blood can fill the distance by capillary action and adapted to be immersed in blood received in said housing; said oscillating member being composed of crystal which is capable of producing vibrations having frequencies from 100 hertz to 1 megahertz, computation means adapted to measure oscillations of said oscillating member as a functional of a known time period and calculate viscosity of blood, said computation means comprising a digital computer and algorithms stored on magnetic media adapted to be executed by said digital computer, said oscillating member connected to said computation means; and a display means coupled to said computing means and adapted to display said calculated viscosity of blood.

4,695,957

DRILLING MONITOR WITH DOWNHOLE TORQUE AND AXIAL LOAD TRANSDUCERS

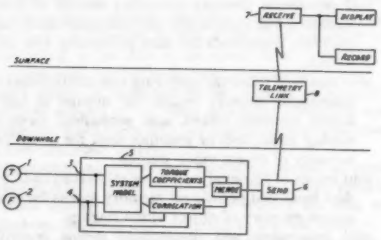
Bernard P. J. M. Peltier, Chesterton, England, assignor to PRAD Research & Development N.V., Curacao, Netherlands

Filed Jun. 27, 1985, Ser. No. 750,562

Claims priority, application United Kingdom, Jun. 30, 1984, 8416708

Int. Cl.[4] E21B *44/00, 47/12*

U.S. Cl. 364—422 **5 Claims**



1. A drilling monitor for sensing downhole drilling conditions, said monitor comprising: downhole transducers for providing signals representative of torque and axial load,

downhole computing means adapted to receive the torque and load signals for implementing a drilling model and for computing therefrom coefficients representative of drilling conditions, said model comprising a function relating torque and axial load to one another, and means for combining said coefficients into a surface sendable signal indicative of drilling conditions.

2. A drilling monitor as claimed in claim 1 wherein the computing means is arranged to calculate the coefficients by implementing a curve fitting algorithm of the function to transducer signal samples over a sample period and wherein the computing means continuously updates the coefficients.

4,695,958

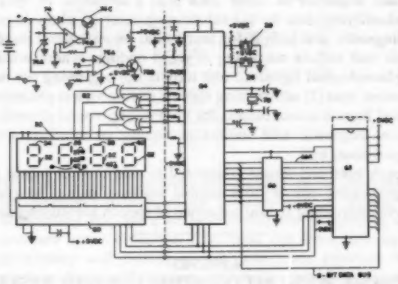
DIGITAL PACING INDICATOR FOR MOTORCYCLES

Kerry Mackenroth, Rte. 2, Box 277, Lacombe, La. 70445

Continuation of Ser. No. 692,666, Jan. 17, 1985, abandoned. This application May 19, 1986, Ser. No. 866,992

Int. Cl.[4] G06F *15/14;* A63B *21/00;* B61L *3/00*

U.S. Cl. 364—424 19 Claims



1. A pacing apparatus for enduro motorcycle racing, comprising:

(a) input means, for inputting into said apparatus, values representing a desired speed for and length of an enduro race segment;

(b) computing means for automatically computing should-be distance, and for automatically computing a plurality of locations at which an unannounced enduro race check point would be possible along a course of an enduro race, from values provided via said input means;

(c) means for initiating said computing means; and

(d) display means, electrically connected to said computing means, for visually displaying to a rider manipulating a motorcycle, should-be distance and an indication of locations at which an unannounced enduro race checkpoint would be possible along a course of an enduro race, wherein at any given time during a race:

a should-be distance which is displayed on said display means represents a distance the motorcycle should have travelled up until the given time for comparison with a distance the motorcycle has actually travelled up until the given time, and

a location, which is indicated upon said display means, whereat an unannounced enduro race check point would be possible, is beyond the should-be distance displayed at the given time, and before all other locations at which an unannounced enduro race check point would be possible.

4,695,959

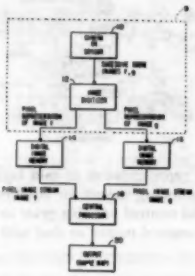
PASSIVE RANGE MEASUREMENT APPARATUS AND METHOD

David E. B. Lees, Lexington, and John Merchant, Needham, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 597,621, Apr. 6, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 902,262

Int. Cl.[4] G01C *3/00;* G01S *13/89*

U.S. Cl. 364—458 13 Claims



12. A method for determining a range from a passive sensor to points in a scene within the field of view of said sensor, comprising the steps:

A. forming one image of at least a portion of said scene from data acquired by a first passive sensor located at one location, said one image comprised of pixels, each pixel having an address locating said pixel in said scene;

B. forming another image of said portion of said scene from data acquired by a second passive sensor at another location removed from said one location, said another image comprised of pixels, each pixel having an address locating it in said another image;

C. calculating location addresses for pixels in said one image to locate said pixels in a first plane a first distance from said one location;

D. calculating a location address for pixels in said another image to locate said pixels in said first plane;

E. calculating an address for said pixels in said another image to warp said another image into registration with said one image;

F. correlating pixels of said one image and said another image at address locations obtained in steps, c, d, and e;

G. calculating a range to regions of said scene represented by pixels which correlate based on an assumption said regions lie in said first plane.

4,695,960

METHOD AND APPARATUS FOR NUMERICAL CONTROL OF MACHINE TOOLS

Jürgen-Andreas Reimann, Erlangen, and Herbert Basilowski, Spardorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 24, 1985, Ser. No. 790,845

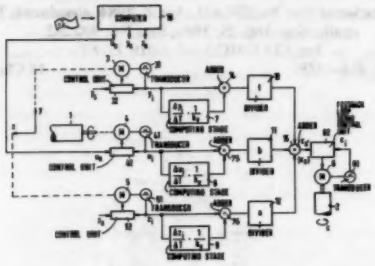
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1984, 3443016

Int. Cl.[4] B23F *5/00;* H02P *5/00*

U.S. Cl. 364—474 10 Claims

1. In a numerical control of a machining apparatus for manufacturing a gear from a workpiece, said numerical control including position control means for controlling a rotation of said workpiece in accordance with a motion of a tool, said numerical control including means for generating an electrically encoded control variable fed to said position control means to determine the operation thereof, the improvement wherein the numerical control is provided with compensation

means for reducing a lag in the response of said position control means and in the rotation of the workpiece with respect to changes in an actual rate of rotation of the tool, said compensation means including computing means for calculating a correction quantity representative of said lag, said compensation means further including means for combining said correction quantity with said control variable prior to the feeding thereof to said position control means so that said lag is reduced.



4,695,961

SOLID STATE OVERCURRENT DETECTOR

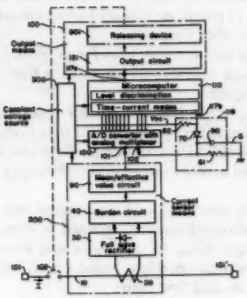
Ichirou Arinobu, Fukuyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1984, Ser. No. 634,361

Claims priority, application Japan, Jul. 29, 1983, 58-140286; Jul. 29, 1983, 58-140287; Nov. 24, 1983, 58-222668; Nov. 24, 1983, 58-222669

Int. Cl.[4] H02H *3/06, 6/00;* **G06G** *7/18*

U.S. Cl. 364—483 **21 Claims**



1. A solid state overcurrent detector comprising:

current sensor means for issuing an output signal indicative of an amount of current in an AC power line;

processing means for: (1) discriminating a level of said output signal of said current sensor means, (2) performing a time-current operation and issuing a time-current operating signal responsive to said discriminating, and (3) producing a charge signal, said charge signal corresponding to an amount of heat energy produced by said current during said time-current operation;

output means for issuing an overcurrent detection signal responsive to said time-current operating signal; and

charge-discharging means for being charged by said charge signal and for being discharged with a predetermined time constant;

wherein said processing means is also for (4) memorizing a voltage remaining in said charge-discharging means as an initial value for performing said time-current operation when a subsequent overcurrent takes place.

4,695,962

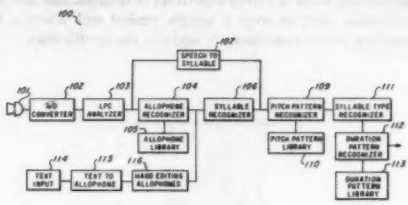
SPEAKING APPARATUS HAVING DIFFERING SPEECH MODES FOR WORD AND PHRASE SYNTHESIS

Kathleen M. Goudie, Lubbock, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 3, 1983, Ser. No. 548,581

Int. Cl.[4] G10L *5/00*

U.S. Cl. 364—513.5 **14 Claims**



1. A speech producing apparatus comprising:

input means for receiving a sequence of input data, said sequence of input data including a first part containing a sequence of phonological linguistic unit indicia and a second part including at least word boundary indicia indicative of word boundaries;

control means connected to said input means for converting said sequence of input data into a sequence of speech identifying data by (1) substituting internal phonological linguistic unit indicia for word final phonological linguistic unit indicia occurring at word endings where vocalic phonological lignuistic unit indicia are beginning the next word, and (2) substituting shorter strong vowel phonological linguistic unit indicia for long strong vowel phonological linguistic unit indicia occurring in nonfinal word positions; and

speech synthesis means connected to said control means for generating one or more audible words of human language corresponding to said sequence of speech identifying data.

4,695,963

PRESSURE SENSE RECOGNITION CONTROL SYSTEM

Shinobu Sagisawa, Yokohama; Teizo Takahama, Yokosuka, and Mitsuo Kobayashi, Fujisawa, all of Japan, assignors to Fuji Electric Corporate Research and Developement Ltd., Yokosuka, Japan

Filed Apr. 10, 1985, Ser. No. 721,804

Claims priority, application Japan, Apr. 13, 1984, 59-75250

Int. Cl.[4] G05B *19/42;* **G01L** *1/16, 5/16*

U.S. Cl. 364—513 **38 Claims**

1. A pressure sense recognition control system for controlling the driving of an object, said system comprising:

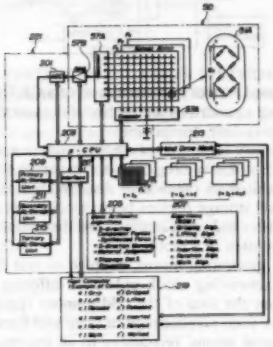
pressure detection means mounted on the object for detecting the distribution, in a plane, of the components of a force in three selected directions of a rectangular coordinate system, said detection means including a plurality of pressure sensor modules, each said module having at least one pressure sensor cell having a pressure sensing member made of single crystal silicon, said pressure sensing member having a pressure receiving surface lying in the plane for receiving the force, and a plurality of diffusion type strain gauges provided on at least one surface of said pressure sensing member which is substantially perpendicular to said pressure receiving surface for detecting the three force components in the three directions applied to said pressure receiving surface, said strain gauges being electrically connected to constitute at least one bridge circuit for producing detection signals indicative of the amplitude of the three force components;

signal processing and storing means for deriving the detection signals from said pressure detection means sequentially, for converting said detection signals into pressure

sense detection data, and for storing the converted pressure sense detection data corresponding to each said pressure receiving surface for each of said component forces in the three directions;

primary arithmetic operation and storage means for processing said pressure detection data derived from said signal processing and storing meansin accordance with a predetermined basic arithmetic/logic operation algorithm to obtain basic pressure data and for storing said basic pressure data;

secondary arithmetic operation and storage means for processing said basic pressure data read out from said primary arithmetic operation and storage means and said pressure sense detection data read from said signal processing and storing means in accordance with a predetermined pressure recognition algorithm to obtain pressure sense recognition data and for storing said pressure recognition data;



tertiary arithmetic operation and storage means responsive to command data from an external control means for controlling the drive of said object for processing said pressure sense detection data read out from said signal processing and storing means, said basic pressure data read out from said primary arithmetic operation and storage means and said pressure sense recognition data read out from said secondary arithmetic operation and storage means in accordance with a predetermined control algorithm to obtain control data required to control the drive of the object and for outputting said control data to the external control means; and

data communication means for communicating data between said tertiary arithmetic operation and storage means and the external control means.

4,695,964

IMAGE CORRECTION PROCESSING METHOD

Youichi Seto, Hadano; Koichi Homma, Sagamihara; Fuminobu Komura, Yokohama, and Hideo Ota, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 30, 1984, Ser. No. 676,921

Claims priority, application Japan, Dec. 2, 1983, 58-226857

Int. Cl.[4] G01C *7/02;* **G03B** *27/68;* **G06F** *15/31*

U.S. Cl. 364—518 **4 Claims**

1. A satellite image geometric correction processing method for use in an image correction system for correcting distortion in an image produced by displaying received data resulting from reciprocating scanning of an image detecting device mounted on a satellite, comprising the steps of:

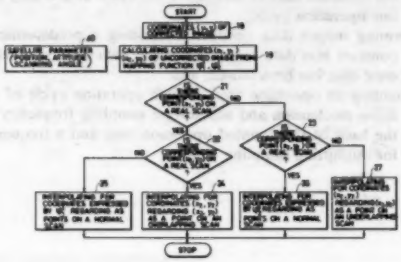
establishing a first coordinate system for a corrected image;

allocating data signals representing received image data to second and third coordinate systems to provide uncorrected images for the forward and backward scanning directions of said image detecting device, respectively;

locating the respective coordinate points of the received image data in said second and third coordinate systems which correspond to the points of said first coordinate system;

determining for each point of said first coordinate system whether or not the corresponding points of said second and third coordinate systems exist on a scanning region in the respective coordinate system;

determining the intensity of image data at a point of said first



coordinate system through interpolation by assuming that the point exists on an underlapping scanning region when the corresponding coordinate point of said second and third coordinate system does not exist on a scanning region of either of said second and third coordinate system; and

visually producing the corrected image data in said first coordinate system on the basis of the determined intensity of each point therein.

4,695,965

MONITORING DATA DISPLAY METHOD AND DEVICE

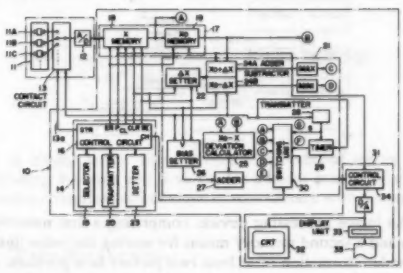
Shigeru Fujita; Hideo Banzai, and Makoto Takada, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 16, 1984, Ser. No. 580,822

Claims priority, application Japan, Feb. 22, 1983, 58-28851

Int. Cl.[4] G06F *15/40;* **G09G** *1/06;* **G01R** *19/50*

U.S. Cl. 364—518 **2 Claims**



2. In a method of displaying monitoring data of a continuously varying operation condition of a drive mechanism driven by an actuator, in which data regarding the operation of the drive mechanism is detected as a variable of time and sampled, the data being output at an output frequency and then displayed, the improvement comprising the steps of:

storing detected data of one operation cycle of the drive mechanism as reference data;

preliminarily displaying the reference data;

visually superposing detected data of an operation cycle of the drive mechanism succeeding to said one operation

cycle on said reference data on a coordinate axis to show deviation between the reference data and detected data of the succeeding operation cycle;

determining allowable uppermost and lowermost limits of said reference data;

storing said allowable uppermost and lowermost limits;

displaying said uppermost and lowermost limits of said reference data on said coordinate axis with the detected data;

calculating deviation data between said reference data and the detected data of said operation cycle succeeding said one operation cycle;

forming output data obtained by adding a predetermined constant bias data to said deviation data after said reference data has been stored; and

counting an operation time of each operation cycle of the drive mechanism and adjusting a sampling frequency on the basis of the counted operation time and a frequency for outputting sampling data.

4,695,966

IMAGE PROCESSING DEVICE

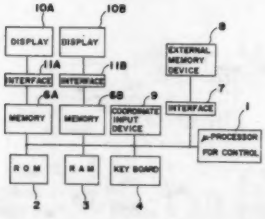
Masaki Takakura, Tenri; Yoji Noguchi, Ikoma; Yasukuni Yamane, and Noritoshi Kako, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 22, 1985, Ser. No. 714,757

Claims priority, application Japan, Mar. 22, 1984, 59-55665; Mar. 22, 1984, 59-55666; Mar. 22, 1984, 59-55668; Apr. 18, 1984, 59-78910; Jun. 4, 1984, 59-116308; Dec. 24, 1984, 59-280825; Mar. 18, 1985, 60-55477

Int. Cl.[4] **G06F** *15/626;* **G09G** *1/28*

U.S. Cl. 364—521 **1 Claim**



1. An image processing device, comprising a first memory means and a second memory means for storing the color light and shade information of at least two picture-face portions, a coordinate inputting means, a means for transferring and processing between said first and second memory means the image information of points specified by said coordinate inputting means, at least two units of display means for displaying the contents of said first memory means and said second memory means respectively, a plurality of means for performing cursor-displays in the different picture-image portions simultaneously on said units of display means corresponding to the coordinate points inputted by said coordinate inputting means, each of said plurality of means for performing cursor-displays being adapted for providing images different in shape from each other.

4,695,967

HIGH SPEED MEMORY ACCESS CIRCUIT OF CRT DISPLAY UNIT

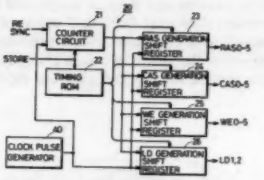
Masahiro Kodama; Tatsuya Sakae, both of Kusatsu, and Yoshio Urano, Ootsu, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Mar. 5, 1985, Ser. No. 708,583

Claims priority, application Japan, Mar. 9, 1984, 59-46232; Mar. 15, 1984, 59-50390

Int. Cl.[4] **G06F** *15/62;* **G09G** *1/14*

U.S. Cl. 364—521 **3 Claims**



1. A high speed memory access circuit of a CRT display unit for representing a pattern by a plurality of dots on the screen of said CRT display unit, comprising:

a frame memory formed by dynamic random access memories including storage regions corresponding to the dots to be represented in the whole display area of said CRT screen, said storage regions being specified in advance by odd numbers and even numbers, so that data can be read out and written in a nibble mode;

clock pulse generating means, coupled to said frame memory, for generating clock pulses of different phases for reading out the data of the odd number regions and the data of the even number regions from said frame memory;

address control means, responsive to an external write signal, for generating address control signals for reading out first and second data, each comprising a plurality of bits and for generating first and second load pulses corresponding to the first and second data, said address control means including:

timing data storage means for storing in advance, write timing data and read timing data of said frame memory, so that the write timing data is provided upon receipt of the external write signal and the read timing data is provided in the absence of the external write signal;

counting means, coupled to said clock pulse generating means, for counting by a first predetermined number the clock pulses generated by said clock pulse generating means in a write mode selected upon receipt of the external write signal, and for counting by a second predetermined number the clock pulses generated in a read mode selected in the absence of the external write signal; and

shift registers, coupled to said timing data storage means and said counting means, in which said write timing data or said read timing data provided from said timing data storage means are loaded each time said counting means counts the clock pulses by said first or second predetermined number, the address control signals and the first and second load pulses being generated by said shift registers in response to the loaded write timing data or read timing data and the clock pulses;

first parallel/series conversion means for receiving and supplying in series a plurality of bits of data corresponding to the odd number regions of the first data read out from said frame memory;

second parallel/series conversion means for receiving and supplying in series a plurality of bits of data corresponding to the even number regions of the first data read out from said frame memory;

third parallel/series conversion means for receiving and supplying in series a plurality of bits of data corresponding

to the odd number regions of the second data read out from said frame memory;

fourth parallel/series conversion means for receiving and supplying in series a plurality of bits of data corresponding to the even number regions of the second data read out from said frame memory;

first control means for controlling said first and third parallel/series conversion means so that when the first load pulse is received, said third parallel-series conversion means is disabled only during the supply of data in series by said first parallel/series conversion means and after completion of the supply of data, said third parallel/series conversion means is enabled; and

second control means for controlling said second and fourth parallel/series conversion means, so that when the second load pulse is received, said fourth parallel/series conversion means is disabled only during the supply of data in series by said second parallel/series conversion means and after completion of the supply of data, said fourth parallel/series conversion means is enabled.

4,695,968

DIGITAL SYSTEM SIMULATION METHOD AND APPARATUS HAVING IMPROVED SAMPLING

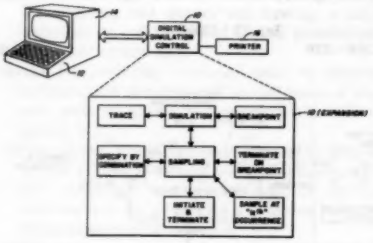
Roderick B. Sullivan, II, Natick; Mahesh Doshi, Framingham, and Lorne Cooper, Watertown, all of Mass., assignors to Prime Computer, Inc., Natick, Mass.

Filed Feb. 2, 1984, Ser. No. 576,364

Claims priority, application PCT Int'l. Appl., Nov. 3, 1983, PCT/US83/01741

Int. Cl.[4] G06G *7/48*; G06F *15/60*

U.S. Cl. 364—578 **13 Claims**



1. Apparatus for hierarchical simulation of the behavior of a digital circuit, the digital circuit having a plurality of connected circuit elements, each said circuit element being any of gate level, function level, behavioral level, or switch level elements, the apparatus comprising

input definition means for defining inputs to said circuit elements, said input definition means including means for defining inputs to any one of gate level, function level, behavioral level, or switch level elements,

output definition means for defining output signal levels for outputs of said circuit elements based upon a defined relationship with said inputs, said output definition means including means for defining output signal levels for any one of gate level, function level, behavioral level, or switch level elements,

simulation means connected with said input definition means and with said output definition means for simulating the behavior of the digital circuit,

sampling means connected with said simulation means for interactively specifying during said simulation of said circuit behavior, at least one of said inputs and outputs to be repeatedly sampled, and

recording means connected with said simulation means and with said sampling means for recording said sampled values.

4,695,969

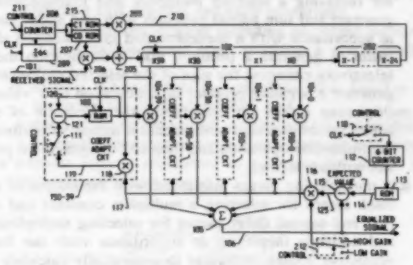
EQUALIZER WITH IMPROVED PERFORMANCE

Nelson R. Sollenberger, West Keanburg, N.J., assignor to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 17, 1984, Ser. No. 682,378

Int. Cl.[4] G06F *15/31*

U.S. Cl. 364—724 **17 Claims**



1. An equalizer comprising

means for receiving samples of a digital signal, said samples being arranged into successive sequences wherein each sequence comprises a plurality of samples and each sample in any sequence has a corresponding sample in another sequence.

means for combining only the corresponding ones of said samples in said sequences during a predetermined time interval.

means for multiplying selected ones of said combined samples by associated coefficients. and

means for summing the products formed by said multiplying means to form an equalizer output.

4,695,970

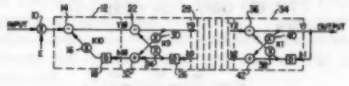
LINEAR PREDICTIVE CODING TECHNIQUE WITH INTERLEAVED SEQUENCE DIGITAL LATTICE FILTER

Karl H. Renner, Dallas, and Alec J. Morton, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1984, Ser. No. 646,869

Int. Cl.[4] G06F *15/31*; G10L *1/00*

U.S. Cl. 364—724 **18 Claims**



1. A digital lattice filter having n operational stages for calculating Y-values and B-values for a linear predictive coding voice compression technique in accordinace with the equations:

$$Y(n)_i = Y(n+1)_i - k(n)_{i-1}$$

$$b(N+1)_i = b(n)_{i-1} + k(n)Y(n)_i$$

where:

n is the operational stage in which the equation is processed,

i is the sample time required to process the equations through the n operational stages, and

k is a multiplier constant, there being n multiplier constants, the digital lattice filter comprising:

full adder means having two inputs and an output for receiving two digital values and generating the digital sum therefore on the output;

stack means for storing the k multiplier constants;

first delay storage means connected to the output of said full adder means for receiving and storing calculated B-values and delaying them for use in the i+1 sample time;

second delay storage means connected to the output of said full adder means for receiving and storing the calculated Y-values as addends for use in calculation of the next sequential Y-value;

multiplication means for interfacing with said adder means for receiving a selected multiplier and multiplicand to generate and sum partial products with said adder means in accordance with a predetermined multiplication algorithm to generate a product, said multiplication means selectively changing the sign of the selected multiplier to generate a negative product for calculation of Y values;

multiplexing means for controlling the operation of said adder means and said multiplication means to perform a multiplication operation and then add the generated product with an addend;

said multiplexing means interfaced with the output of said stack means for selecting a multiplier constant and said first and second delay means for selecting multiplicands and addends therefrom in accordance with the linear predictive coding technique to sequentially calculate the Y- and B-values;

timing means for controlling said multiplexing means, said first and second delay means and said stack means to calculate the Y- and B-values in an interleaved sequence with Y- and B-values alternately calculated, the calculation of a B-value using the previously calculated Y-value as a multiplicand and a delayed B-value output from said first storage means as an addend, and calculation of a Y-value utilizing the previously calculated Y-value stored in said second storage means as an addend and a delayed B-value output from said first storage means as a multiplicand; and

register means for storing the final Y-value calcualted in accordance with the linear predictive coding technique for n equal to 1.

4,695,971

CIRCUIT FOR RAPIDLY DETERMINING THE GREATEST DIFFERENCE AMONG THREE BINARY NUMERICAL VALUES

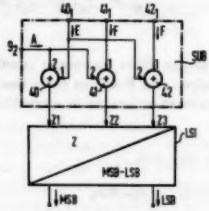
Udo Reimann, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 30, 1984, Ser. No. 676,673

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1983, 3343404

Int. Cl.[4] G05F 7/50; G05B 1/00

U.S. Cl. 364—769 **6 Claims**



1. A circuit for rapidly determining a greatest difference among three binary values and for classifying said greatest difference in one of a plurality of ranges and for encoding a control signal consisting of two control bits identifying the range in which said greatest difference is classified, said circuit comprising:

a subtraction unit for forming at respective outputs three binarily represented differences from said three binary values, each binarily represented difference having an operational sign bit followed by a plurality of bits of decreasing significance; and

a logic unit connected to the outputs of said subtraction units, said logic unit having a plurality of operational sign inputs for receiving said respective operational sign bits and having a selected number of data inputs for receiving only a selected number of the most significant bits from each of said binarily represented difference, said logic unit having two logic sub-units for respectively forming said control bits, each logic sub-unit having a plurality of first stage NOR gates and a plurality of first stage AND gates, each of said first stage NOR and AND gates having a plurality of inputs to which said operational sign bits and a number of said most significant bits less than said selected number of most significant bits from each said binarily represented difference are supplied, and each logic sub-unit further having a second stage NOR gate to which the output of each of said first stage NOR gates and AND gates are supplied, said second stage NOR gate having an output at which the control bit for the respective logic sub-unit is present.

4,695,972

CORRELATOR HAVING SPURIOUS SIGNAL CANCELLATION CIRCUITRY

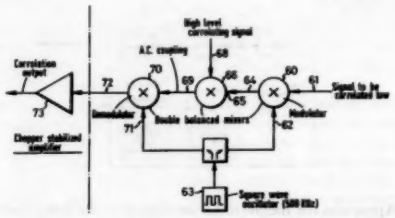
James H. A. McKeown, Ipswich, England, assignor to British Telecommunications Public Limited Company, England

Continuation-in-part of Ser. No. 502,755, Jun. 9, 1983, Pat. No. 4,561,067. This application May 24, 1985, Ser. No. 737,417

Claims priority, application United Kingdom, Jun. 23, 1982, 8218166

Int. Cl.[4] G06G 7/19

U.S. Cl. 364—819 **13 Claims**



1. A correlator comprising:

first input means for a first signal;

second input means for a second signal;

a source of predetermined alternating current (ac) signals having a predetermined frequency;

first mixer means connected to said first input means and said source to mix thereby the first signal and said ac signals in a manner to modulate said ac signals with said first signal to generate a mixed signal;

multiplying means connected to said first mixer means and to said second input means to multiply thereby said mixed signal and the second signal to generate a multiplying signal;

second mixer means connected to the multiplying means and to said source to mix thereby the multiplying signal and the said ac signals in a manner to generate a demodulated output signal; and

means for integrating the demodulated output signal from said second mixer means to thereby reduce the effects of any spurious signals associated with said first or said second signal.

4,695,973

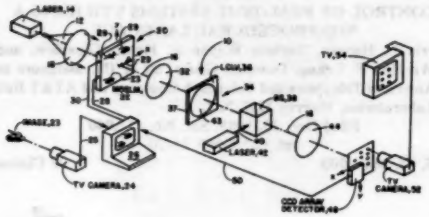
REAL-TIME PROGRAMMABLE OPTICAL CORRELATOR

Francis T. S. Yu, State College, Pa., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 22, 1985, Ser. No. 790,292

Int. Cl.[4] G06G 9/00

U.S. Cl. 364—822 18 Claims



1. A real-time programmable optical correlator, comprising:

means for providing a first beam of electromagnetic radiation and directing said beam of electromagnetic radiation along a preselected optical axis;

means located at a first preselected location along said optical axis for receiving said first beam of electromagnetic radiation, a first input signal and a second input signal and for generating images representative of said first and said second input signals;

means at a second preselected location along said optical axis for receiving said images and forming a joint Fourier transform of said images at a third preselected location along said optical axis;

means for providing a second beam of electromagnetic radiation and directing said second beam of electromagnetic radiation to said third preselected location along said optical axis;

means positioned at said third preselected location along said optical axis for receiving said joint Fourier transform of said images and said second beam of electromagnetic radiation and for generating a coherent power spectrum representative of said images;

means positioned at a fourth preselected location along said optical axis for forming an inverse Fourier transform of said coherent power spectrum of said images at a fifth preselected location along said optical axis, said inverse Fourier transform being representative of a correlation between said first and said second input signals.

4,695,974

CIRCUIT ARRANGEMENT FOR RECEIVING AND/OR TRANSMITTING BINARY SIGNALS SERIALLY APPEARING ON THE PLURALITY OF LINES TO AND FROM A PROCESSING DEVICE CONTAINING A MICRO-COMPUTER OR MICROPROCESSOR

Pieter Wolff, and Hartmut Wedler, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 4, 1985, Ser. No. 740,976

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1984, 3420787

Int. Cl.[4] G11C 7/00, 19/00

U.S. Cl. 364—900 3 Claims

1. A circuit arrangement for receiving and processing binary signals appearing serially on a plurality of signal receiving lines and transmitting the processed signals as serially appearing binary signals by way of a plurality of signal output lines, the serial signals comprising

a predetermined number of bits, comprising:

a plurality of first clock-controlled flip-flops each connected to a respective signal receiving line;

a plurality of second flip-flops each connected to a respective signal output line;

a plurality of selectively operable switches each including a plurality of inputs and each including a output connected to a respective second flip-flop;

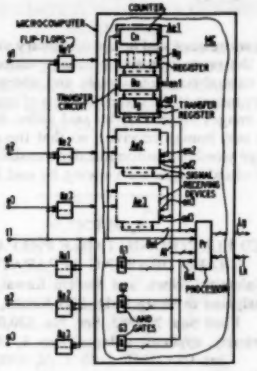
a plurality of signal receiving devices each connected to a respective first flip-flop and each comprising

a clock-controlled counter including an output for carrying an enable signal upon reaching a predetermined count,

a register connected to the respective first flip-flop for receiving the clocked end bits, and

a transfer circuit connected to said register and including an enable input connected to said output of said counter;

a transfer register connected to said transfer circuit and including an address input;



a bus system including an address bus connected to each of said address inputs of said transfer registers and to some of said inputs of said switches, an incoming data bus connected to each of said transfer registers, and an output data bus connected to some of said inputs of each of said switches;

processing means connected to said address bus, to said incoming data bus and to said output data bus, said processor operable to select the signal receiving lines via the respective signal transfer registers, to select the signal output lines via the respective switches, and to receive and process the incoming data and transmit the processed data; and

each of said flip-flops and said processor comprising a common clock input for synchronous operation of said arrangement.

4,695,975

MULTI-IMAGE COMMUNICATIONS SYSTEM

Orest J. Bedrij, Poughkeepsie, N.Y., assignor to Profit Technology, Inc., New York, N.Y.

Filed Oct. 23, 1984, Ser. No. 663,893

Int. Cl.[4] G06F 3/14, 3/16

U.S. Cl. 364—900 41 Claims

1. A visual communication device for translating a natural language into visual images to be viewed by a human receiver comprising, in combination,

video memory means for storing a plurality of predetermined video images at predetermined image addresses,

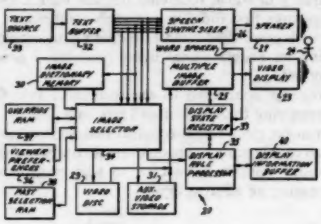
video display means for displaying selected images from said video memory to said human receiver,

image dictionary memory means for storing predetermined sets of said image addresses associated with respective

ones of a predetermined set of natural language words and addressable to obtain the respective stored set of image addresses for a selected natural language word,

input means for receiving selected natural language words, and

control means for repetitively obtaining individual ones of the selected natural language words from said input



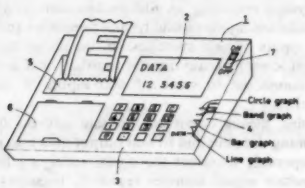
means, addressing said image dictionary memory means to obtain the respective sets of image addresses for the selected natural language words, and addressing said video memory means at the respective sets of image addresses to obtain images for display by said video display for viewing by said human receiver, so that the selected natural language words are automatically translated into a succession of visual images for viewing by said human receiver.

4,695,976

COMBINED ELECTRONIC TABLE PREPARATION AND GRAPH DRAWING APPARATUS

Yasuhiro Nakanishi, Nara, and Shoichi Kawai, Osaka, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 7, 1983, Ser. No. 530,071
Claims priority, application Japan, Sep. 8, 1982, 57-157326
Int. Cl.[4] G06F *3/02, 3/14, 7/00*
U.S. Cl. 364—900 **1 Claim**



1. An integrated electronic device having table preparation and graph drawing capabilities comprising:

input means for inputting elements of numerical data into the apparatus:

table preparation means, responsive to an operation of said input means, for tabling the input elements of numerical data into data columns and data rows, each element of numerical data being in a said data column and a said data row, said table preparation means including switch means for controlling start, advance and end of tabling of the numerical data;

means, responsive to an operation of said table preparation means, for summing said elements of numerical data in each said data column or each said data row to form column sums or row sums, respectively, and for storing said column sums or row sums, said means for summing and storing being also directly responsive to said input means for storing numerical data introduced thereby;

graph drawing means, responsive to an operation of said means for summing and storing, for drawing a graph from a plurality of different graph types based on said column sums or said row sums stored therein; and

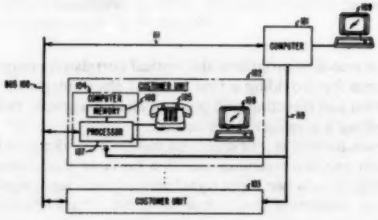
mode selection means for selecting a table preparation mode and a graph drawing mode, said mode selection means selecting the table preparation mode to activate the table preparation means and selecting the graph drawing mode to actuate the graph drawing means, said mode selection means further selecting, when said graph drawing mode is selected, the type of graph to be drawn by said graph drawing means.

4,695,977

CONTROL OF REAL-TIME SYSTEMS UTILIZING A NONPROCEDURAL LANGUAGE

Terris L. Hansen, Aurora; Wayne E. Hyatt, Glenview, and Wu-Hon F. Leung, Downers Grove, all of Ill., assignors to American Telephone and Telegraph Company and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 23, 1985, Ser. No. 812,940
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—900 **32 Claims**



1. A method for controlling a real-time telephone process utilizing a computer system executing program scripts written in a nonprocedural language with each of said scripts defining an operation to be performed by said said real-time process, comprising the steps of:

executing a first one of said scripts by said computer system to control a first operation in said process in response to a first signal from said process;

blocking the execution of a second one of said scripts in response to said first signal by said computer system in response to the next sequential signal;

reexecuting said first one of said scripts to control a second operation in said process by said computer systems in response to a second signal from said process; and

allowing in said execution of said one of said scripts by said computer system the execution of said second one of said scripts by said computer system in response to said second signal thereby performing another operation in said process.

4,695,978

SEMICONDUCTOR MEMORY DEVICE

Tohru Itakura, Kuwana, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 14, 1985, Ser. No. 798,186
Claims priority, application Japan, Nov. 15, 1984, 59-241205
Int. Cl.[4] G11C *5/02*
U.S. Cl. 365—51 **5 Claims**

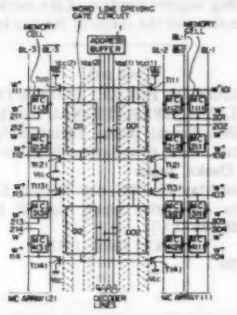
1. A semiconductor memory device comprising:

a pair of memory cell arrays having a plurality of word lines, a plurality of bit lines, and a plurality of memory cells disposed at intersections of said word lines and said bit lines;

a plurality of word line driving transistors respectively connected to said word lines and aligned at inner edges of said pair of memory cell arrays;

a pair of word line driving gate circuits having input terminals and output terminals, the pitch of said word line

driving gate circuits being matched to the pitch of adjacent word lines, arranged along the direction of said word lines between said pair of memory cell arrays, the output terminals of said word line driving gate circuits being respectively connected to said word line driving transistors; and



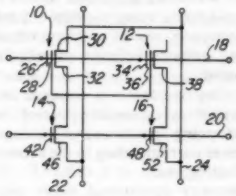
a plurality of decoder lines extending between said pair of word line driving gate circuits and connected to said input terminals of said word line driving gate circuits, said pair of word line driving gate circuits decoding signals on said decoder lines independently input to said input terminals, said decoded signals driving said word line driving transistors.

4,695,979

MODIFIED FOUR TRANSISTOR EEPROM CELL

James A. Tuvell, Houston, and Michael C. Smayling, Missouri City, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 9, 1985, Ser. No. 773,492
Int. Cl.[4] G11C *11/34*
U.S. Cl. 365—185 **6 Claims**



1. An electrically erasable programmable memory cell of a type having interconnected transistors coupled to a conducting read, write, sense and row line, comprising:

a floating gate transistor having a control gate, connected to said sense line, a source to drain conducting path and a floating gate;

a tunnel device having a cathode coupled to the floating gate, an anode, and a tunnel control electrode coupled to the sense line;

read switch means for providing a conducting path between said read line and one end of the source to drain path of said floating gate transistor in response to the voltage on said row line exceeding a selective threshold value and for opening the conductive path when the row line voltage falls below the selective threshold value;

write switch means for providing a conductive path between said write line and the anode of said tunnel device in response to the voltage on said row line exceeding a write selective value and for opening the conductive path when the row line voltage falls below the write selective value;

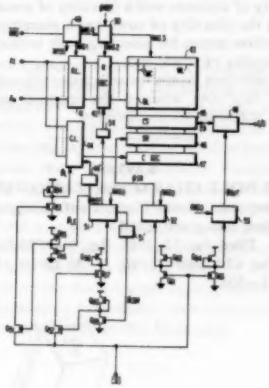
wherein another end of the source to drain path of said floating gate transistor is connected to said write line and said tunnel device is operative in response to a voltage between said sense line and said write line exceeding a tunnel threshold value to tunnel electrons to or from said cathode.

4,695,980

INTEGRATED CIRCUIT HAVING A COMMON INPUT TERMINAL

Yukio Fukuzo, and Yasukazu Inoue, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jul. 9, 1985, Ser. No. 753,091
Claims priority, application Japan, Jul. 9, 1984, 59-141803
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—222 **8 Claims**



1. An integrated circuit comprising:

a common external terminal;

a first circuit for receiving a first control signal;

a second circuit for receiving a second control signal;

a first switch coupled between said common external terminal and said first circuit;

a second switch coupled between said common external terminal and said second circuit;

a first detection circuit coupled to said first circuit for generating a first detection signal when said first circuit assumes a first state;

a first control circuit responsive to said first detection signal for rendering said first switch conductive to allow said first circuit to receive a signal applied to said common external terminal;

a second detection circuit coupled to said second circuit for generating a second detection signal when said second circuit assumes a second state; and

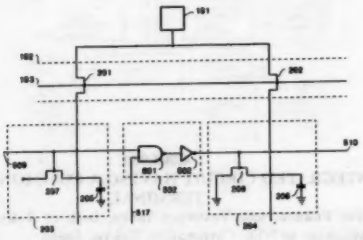
a second control circuit responsive to said second detection signal for rendering said second switch non-conductive to isolate said second circuit from said common external terminal.

4,695,981

INTEGRATED CIRCUIT MEMORY CELL ARRAY USING A SEGMENTED WORD LINE

Joseph P. Sikich, and Richard R. Duncombe, both of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 4, 1984, Ser. No. 678,181
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—227 **8 Claims**



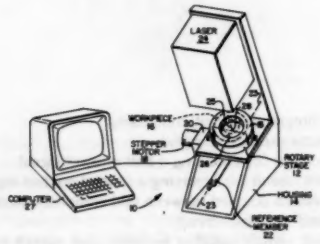
1. A combination comprising:
a plurality of cells arranged in an array, the array having a plurality of columns and a plurality of rows wherein each row in the plurality of rows has a plurality of segments;
row selection means for selecting cells within a first row of the plurality of rows; and,
segment selection means for selecting cells within a segment of the first row wherein the segment selection means selects segments accumulatively.

4,695,982

HUB HOLE CHARACTERIZATION SYSTEM

Vladimir Preysman, Santa Clara, Calif., assignor to Verbatim Corporation, Sunnyvale, Calif.

Filed Jul. 12, 1985, Ser. No. 754,543
Int. Cl.[4] G06F *15/46, 15/70*; G01B *21/30*
U.S. Cl. 364—506 **6 Claims**



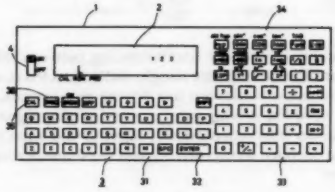
1. Apparatus for characterizing the roundness of a workpiece aperture, said apparatus comprising:
(a) a rotary stage adapted to receive a workpiece having an aperture to be characterized, said rotary stage including a central aperture surrounding the workpiece aperture;
(b) a reference surface mounted to provide a fixed radial reference point approximately at the axis of rotation of said rotary stage;
(c) movement means for incrementally rotating said rotary stage, to rotate the workpiece in a stepwise manner around the fixed radial reference point;
(d) a non-contact detection means for measuring a radial distance associated with each angular position of the workpiece, each radial distance extending along a predetermined radial path between the fixed radial reference point and the corresponding periphery of the workpiece aperture; and
(e) programmable computer means, in communication with said movement means and having an input for receiving a signal from said detection means corresponding to each radial distance that is measured, said computer means being adapted to coordinate each radial distance with the corresponding angular position of the workpiece, to characterize the size and the shape of the workpiece aperture.

4,695,983

CALCULATOR OR POCKET COMPUTER WITH SELECTABLE OPERATIONAL SEQUENCE

Koichi Oda, Sakai; Koichi Hatta, Yamatokoriyama, and Toshihiko Sumitani, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1984, Ser. No. 614,135
Claims priority, application Japan, May 30, 1983, 58-97341; May 30, 1983, 58-83072[U]
Int. Cl.[4] G06F *3/02*
U.S. Cl. 364—709 **2 Claims**



1. A calculator for executing formula calculations according to a selected operational sequence, said calculator comprising:
input keys for inputting data into said calculator according to individual key operations;
means for selecting modes under which a plurality of said input keys can be operated, said means for selecting modes comprising a sequential operational key for activating a sequential operational mode and a formula memory operational key for activating a formula memory operational mode, each said mode being capable of having different operational sequences, one of said keys of said means for selecting being actuated before a plurality of said input keys are actuated;
means for executing operations in response to actuation of one of said keys of said means for selecting, said means for executing performing operations in accordance with operational sequences corresponding to the actuated key of the means for selecting; and
said formula memory operational mode calculating said formulas according to an actuation sequence of said individual key operations according to a preference order of said operations after input of said individual key operations, said preference order being capable of calculating said formulas in a sequence different from said actuation sequence.

4,695,984

METHOD FOR ESTABLISHING A SURFACE CONSISTENT CORRECTION FOR THE EFFECTS OF THE LOW VELOCITY LAYER IN SEISMIC DATA PROCESSING

Ernest F. Paal, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Dec. 24, 1984, Ser. No. 685,522
Int. Cl.[4] G01V *1/36*
U.S. Cl. 367—54 **19 Claims**

1. A method for correcting multifold seismic data for the effects of the low-velocity layer, comprising the steps of:
(a) selecting at least three sets of seismic traces from said

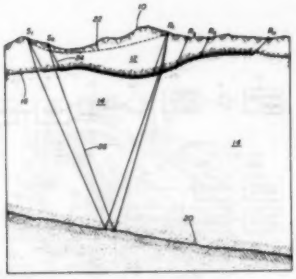
seismic data, the traces within each of said seismic trace sets having a common offset;

(b) determining for each trace within said seismic trace sets the source to receiver transit time for that seismic signal path corresponding to refraction along the lower boundary of the low-velocity layer;

(c) establishing for each trace within said seismic trace sets an equation of the form

$$T_{ij}=S_i+R_j+T_{1\,PS}$$

where



T_{ij}=source to receiver transit time along the refraction interface at the lower boundary of the low-velocity layer

S_i=time contribution due to source at location i

R_j=time contribution due to receiver at location j

T_1=transit time for seismic wave travel a preselected distance along the lower boundary of the low velocity layer; and

(d) solving the equations established in step c;

(e) applying the values S_i and R_j to correct said multifold seismic data for the effects of the low velocity layer; and,

(f) displaying the corrected multifold seismic data.

4,695,985

APPARATUS FOR PREVENTING A ROUNDABOUT OF SUPERSONIC WAVE IN A SUPERSONIC WAVE TRANSMITTER AND RECEIVER FOR A VEHICLE

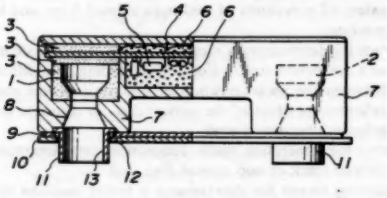
Seiei Takeoka, Yokohama, Japan, assignor to Niles Parts Co., Ltd, Omorinishi, Japan

Filed Mar. 18, 1986, Ser. No. 840,748

Claims priority, application Japan, Nov. 26, 1985, 60-182013[U]

Int. Cl.⁴ G01S *9/66*; H04R *1/02*

U.S. Cl. 367—87 **15 Claims**



1. An apparatus for preventing a roundabout of a supersonic wave in a supersonic wave transmitting and receiving device having a supersonic wave sender and a supersonic wave receiver for a vehicle in which a vehicle height and the like with respect to a road surface is sensed by a reflected wave of the supersonic wave device, said sensor and said receiver each having a horn which opens outwardly to wave-passing openings in said device, said apparatus being characterized in that a cylindrical member for preventing the roundabout of the supersonic wave between said sender and said receiver is arranged on said device at one of said wave-passing openings in said device and in communication with said horn connecting said wave-passing opening with at least one of the sender or the receiver of the supersonic wave transmitting and receiving device for use in transmitting the supersonic wave signal and receiving the reflected supersonic wave from and to said device.

4,695,986

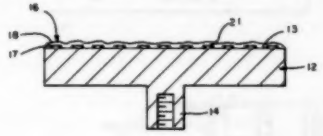
ULTRASONIC TRANSDUCER COMPONENT AND PROCESS FOR MAKING THE SAME AND ASSEMBLY

James M. Hossack, Redmond, Wash., assignor to Ultrasonic Arrays, Inc., Woodinville, Wash.

Filed Mar. 28, 1985, Ser. No. 716,988

Int. Cl.⁴ H04R *1/02, 31/00*

U.S. Cl. 367—140 **6 Claims**



1. In an ultrasonic transducer assembly, a cylindrical element having a planar surface formed of a conducting material, an insulating foil element having first and second surfaces overlying the planar surface of the cylindrical element, the foil element having a conducting layer carried by the first surface and a plurality of spaced apart support elements formed of an insulating material disposed between the planar surface of the cylindrical element and the second surface of the foil whereby when an electric field is applied between the conducting layer of the foil element and the planar surface of conducting material of the cylindrical element, the foil element will move toward and away from the spaced apart support elements at a predetermined frequency in accordance with the applied voltage to create ultrasonic energy at this frequency.

4,695,987

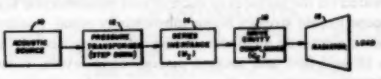
HYDROACOUSTIC APPARATUS

John V. Bouyoucos, Pittsford, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.

Filed Jan. 7, 1985, Ser. No. 689,521

Int. Cl.⁴ B06B *3/00*; G01V *1/38*; H04R *1/02*

U.S. Cl. 367—143 **33 Claims**



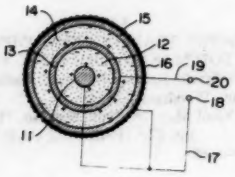
1. Hydroacoustic apparatus for transferring acoustic energy efficiently and over a broad bandwidth to an acoustic load such as, but not limited to, either a radiating plate or disc, which apparatus comprises a source of acoustic energy in which liquid flow is modulated, a load coupling structure including a liquid filled drive cavity, and a coupling element including a stepped piston transformer in series between said source and said liquid filled drive cavity, said load coupling structure and said coupling element defining a tuned filter having a center frequency f_o and bandwidth Δf over which said acoustic energy is transmitted to said load.

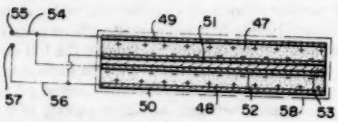
4,695,988

UNDERWATER PIEZOELECTRIC ARRANGEMENT

Hisao Banno, Tohkai, Japan, assignor to NGK Spark Plug Co. Ltd., Japan

Filed Sep. 5, 1985, Ser. No. 772,911
Claims priority, application Japan, Sep. 12, 1984, 59-192318; Oct. 19, 1984, 59-221050
Int. Cl.[4] G01V 1/38
U.S. Cl. 367—154 11 Claims





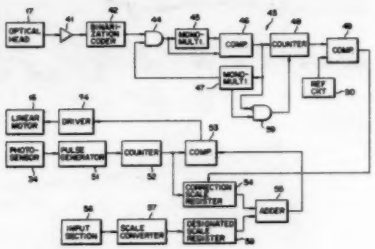
1. An underwater piezoelectric arrangement comprising first and second piezoelectric layers, said first piezoelectric layer being made of a polarized ceramic-polymer composite having a first hydrophone constant and generating electrostatic charges of opposite polarities on the opposed surfaces thereof in response to stresses which act on said first piezoelectric layer in a direction parallel to said surfaces thereof, said second piezoelectric layer being made of a poled ceramic-polymer composite having a second hydrophone constant smaller than said first constant and generating electrostatic charges of opposite polarities on the opposed surface thereof in response to stresses which act on said second piezoelectric layer in a direction parallel to said surfaces thereof, the levels of said charges generated on the surfaces of each of said piezoelectric layers in response to said stresses being substantially equal; positive and negative electrode members on respective opposed surfaces of each of said first and second piezoelectric layers; means for electrically connecting the positive electrode member of said first layer and the negative electrode member of said second layer, and for electrically connecting the negative electrode member of said first layer and the positive electrode member of said second layer; and means for connecting a pair of terminals to said positive electrode members and negative electrode members so as to provide detection of an output signal produced in accordance with the difference between the hydrophone constants of said first and second piezoelectric layers only in response to acoustic waves being received by the arrangement and so as to provide cancellation of noise signals produced in accordance with said charges on said first and second piezoelectric layers.

4,695,989

OPTICAL DISC APPARATUS WITH SELECTIVE TRACK ACCESSING USING A CORRECTION SCALE VALUE

Katsumi Kimoto, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 525,821, Aug. 23, 1983, abandoned.
This application Sep. 29, 1986, Ser. No. 912,662
Claims priority, application Japan, Aug. 31, 1982, 57-150955
Int. Cl.[4] G11B 27/28, 7/095, 21/08
U.S. Cl. 369—32 5 Claims



1. An optical disk apparatus comprising:

optical head means, movable in a radial direction on an optical disk having a number of tracks including inner and outer tracks, said optical head means having a photosensor for photoelectrically detecting said tracks to produce a track signal having constant signal components corresponding to said tracks, said photosensor photoelectrically detecting at least one of scars, scratches and dust accidentally existing on said optical disk to produce an irregular signal;

driving means for driving said optical head means in a radial direction on said optical disc;

gate means supplied with the track signals and irregular signal produced from said photodetector of said optical head means to inhibit the irregular signal corresponding to at least one of scars, scratches and dust and to pass the track signal;

means for obtaining a reference position signal from the track signal passed through said gate means and corresponding to one of the inner and outer tracks;

scale means having an initial position for measuring the extent of movement of said optical head from said initial position;

means for determining a measured value of said scale means as a correction scale value corresponding to a difference between the initial position of said scale means and the reference position of the optical disk, in response to said reference position signal;

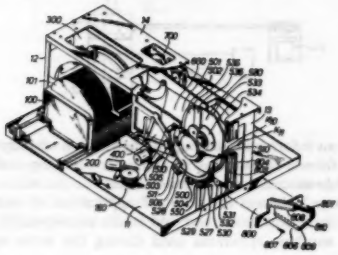
means for generating track designation data designating a desired track of said optical disc; and

accessing means for determining a preset position of said optical head from said correction scale value and track designation data and causing said driving means to move said optical head to said preset position, said accessing means including means for converting said track designation data into a designated scale value, means for adding together said designated scale value and said corrected scale value to obtain an access scale value, and means for comparing a scale value corresponding to the extent of movement of said scale means and said access scale value.

4,695,990
AUTOCHANGER TYPE DISC PLAYER

Hiroshi Kawakami, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Division of Ser. No. 618,937, Jun. 8, 1984, Pat. No. 4,601,026.
This application Mar. 4, 1986, Ser. No. 836,160
Claims priority, application Japan, Jun. 13, 1983, 58-105281
Int. Cl.[4] G11B 17/04, 17/22
U.S. Cl. 369—38 9 Claims



1. An autochanger type disc player for selectively playing stored discs comprising:

a housing having a disc storage section, a disc playback section, and means for slidably positioning said disc storage section relative to said disc playback section, said disc storage section having means for retaining a plurality of said discs, said disc playback section having means for individually playing said discs and means for holding said playback section in a receive position and an unload position;

first disc transferring means between said disc storage section and said playback section to allow transfer of said discs from said disc storage section to said receive position, said first disc transferring means including loading means for transmitting a first rotating force to said discs and for guiding said discs along said first disc transferring means, said loading means including pulley means for rotatably engaging the periphery of said discs and a loading member for continuing rotation of said discs within said first disc transferring means and for guiding said discs into said receive position;

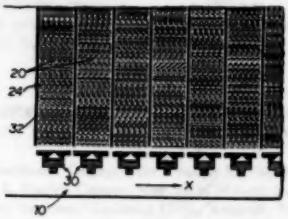
second disc transferring means between said disc storage section and said playback section to allow transfer of said discs from said unload position to said disc storage section, said second disc transferring means including unloading means for transmitting a second rotating force to said discs in a direction of rotation opposite said first rotating force and for guiding said discs into said disc storage section;

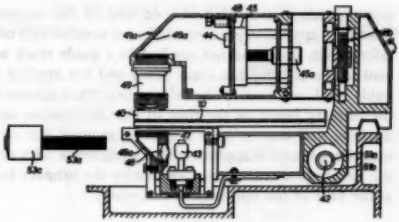
means for controlling said disc playback section and said means for slidably positioning said disc storage section, wherein said retaining means is aligned with said second disc transferring means to allow said disc playback section to play discs received from said disc storage section through said first disc transferring means and to return said discs to said disc storage section through said second disc transferring means.

4,695,991
READING INFORMATION STORED IN MULTIPLE FRAME FORMAT

Geoffrey M. Hudson, Fitzroy, Australia, assignor to Storage Research Pty. Ltd., Hawthorn, Australia

Continuation-in-part of Ser. No. 403,763, Jul. 28, 1982, abandoned. This application Apr. 20, 1984, Ser. No. 602,453
Claims priority, application Australia, Dec. 9, 1980, PE6831; Dec. 9, 1981, PCT/AU81/00188; Nov. 8, 1983, PG2272
Int. Cl.[4] G11B 7/09, 20/10
U.S. Cl. 369—44 59 Claims





42. A method of observing a succession of machine readable position markers in a medium comprising:

observing the markers in turn and storing observed values indicating marker position for at least two markers preceding each marker being observed;

determining whether each observed value is outside a selected trend established by the stored values by more than a predetermined margin; and, if so,

reducing the effect of that value.

4,695,992
OPTICAL INFORMATION RECORDING-REPRODUCING APPARATUS IN WHICH THE RELATIVE POSITION OF A PRIMARY BEAM AND SECONDARY BEAMS ON RECORDING MEDIUM IS VARIED DURING RECORDING AND REPRODUCTION OF INFORMATION

Shigeru Aoi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1984, Ser. No. 574,060
Claims priority, application Japan, Jan. 31, 1983, 58-12659; Jan. 31, 1983, 58-12663
Int. Cl.[4] G11B 7/135, 7/00
U.S. Cl. 369—46 8 Claims

1. An optical information recording-reproducing apparatus comprising:

a light source;

grating means for splitting a beam from said light source into a primary beam and at least two secondary beams;

an optical system for applying the primary beam and the secondary beams to a recording medium;

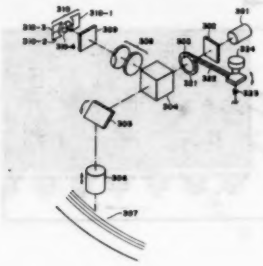
means for selectively carrying out an information recording on the recording medium in the form of an information

track by the primary beam and a reproduction of the recorded information from the information track;

means for detecting the secondary beams modulated by the recording medium to obtain a tracking signal;

means for effecting tracking of the primary beam and the secondary beams according to the tracking signal; and

means for varying a relative position of the primary beam and the secondary beams on the recording medium between times of the information recording and the information reproduction so that at least two of the secondary beams are applied to positions different widthwisely of the information track and not applied to a guide track adjacent to the information track being and not applied to a guide track adjacent to the information track scanned by the primary beam, at the time of the information reproduction, and that at least a part of at least one of the secondary beams is applied to said guide track adjacent to the information track being formed by the primary beam, at the time of the information recording.



4,695,993

OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS AND OPTICAL DISC

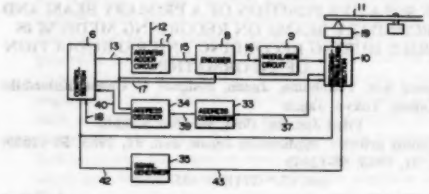
Yuuji Takagi; Isao Satoh, both of Neyagawa, and Tatsuo Sugimura, Fukuoka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 10, 1985, Ser. No. 743,314

Claims priority, application Japan, Jun. 15, 1984, 59-122999; Jun. 15, 1984, 59-123005; Nov. 19, 1984, 59-243665

Int. Cl.[4] G11B *5/09, 15/04*

U.S. Cl. 369—54 **6 Claims**



1. An information recording and reproducing apparatus comprising means including a recording medium having an information recording region divided into a plurality of sectors each having an address part recorded with an address signal and a data recording part to be recorded with data, and means for overwriting a predetermined signal in the address part of a sector thereby making the reproduction of the sector address of the address part impossible.

4,695,994

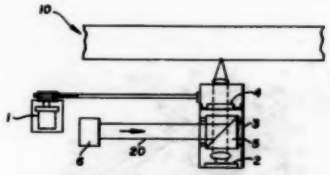
METHOD AND APPARATUS FOR VARYING LASER INTENSITY LEVEL

Christiaan Steenbergen, Colorado Springs, Colo.; Peter G. Howard, Eugene, Oreg.; Roger R. Bracht, and Henk van der Put, both of Colorado Springs, Colo., assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Filed Apr. 5, 1985, Ser. No. 720,218

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—54 **19 Claims**



1. In an information storage device which employs radiant energy from a radiant energy source for reading and writing detectable modulations in record media for use with said storage device, wherein the point of application of said radiant energy upon said media and said media are moveable relative to one another, apparatus used during the write operation comprising:

a radiant energy source controlling apparatus for varying the intensity of radiant energy at said point of application in said record media among at least a low tensity first level sufficient for reading, a second level of higher intensity than said first level sufficient for writing, and an intermediate level of an intensity different from said first level and insufficient for writing during the normal operations of said information storage device but of a high intensity than that required for reading;

first means for causing said radiant energy source to emit radiant energy at said second level during a period of writing the detectable modulations in the record media;

second means for causing said radiant energy source to emit radiant energy at said first level during a period of reading the detectable modulations in the record media; and

third means for causing said radiant energy source to emit radiant energy at said intermediate level during a period when not writing of the detectable modulations is being done.

4,695,995

FRONT LOADING DISK PLAYER WITH IMPROVED DISK SENSOR POSITIONING

Toshiaki Koizumi, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 27, 1985, Ser. No. 769,644

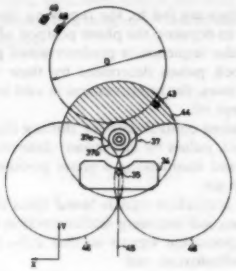
Claims priority, application Japan, Aug. 28, 1984, 59-179024; Aug. 28, 1984, 59-179025

Int. Cl.[4] G11B *17/04*

U.S. Cl. 369—75.2 **5 Claims**

1. A front loading disk player comprising: a housing (2); playing means provided in said housing including an optical pickup and a turntable (37), said turntable comprising a tapered wheel (37*b*) sized to be received in a center hole of a disk; a disk conveying mechanism for conveying a disk to a playing position, said disk conveying mechanism comprising a disk carrying portion (10,19) capable of carrying any one of a plurality of disks (16,17,18) of different outer diameters; means for selectively projecting said disk carrying portion out of said housing and retracting said disk carrying portion into said housing; a clamping mechanism for clamping a disk conveyed to said playing position against said turntable; and detecting means for detecting when said disk has been clamped in said playing position against said turntable, said detecting means

comprising a reading spot of said optical pickup and a smallest disk sensor (43) for detecting the presence of a smallest diameter disk, said smallest disk sensor having a detecting point disposed within a range (44) outside an outer circumference of said smallest diameter disk (16) with a center of a rotary shaft of said turntable as a center of said smallest diameter disk, and



said range excluding a portion encompassed by a locus of cylinders (46) having diameters which are equal to the diameter of said smallest disk, said cylinders circumscribing the reading spot on a locus (45) of reading spots of said optical pickup and being tangent to said outer circumference of said tapered wheel.

4,695,996

AUTOMATIC LOADING DISC PLAYER

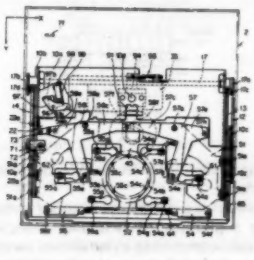
Masanori Sugihara; Atsushi Kurosawa; Akihiko Okamoto, all of Kawagoe; Kouji Shimoda, Tokorozawa; Toshiyuki Kimoto, Tokorozawa, and Tomomitsu Kouno, Tokorozawa, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 11, 1985, Ser. No. 721,933

Claims priority, application Japan, Apr. 11, 1984, 59-072050; Sep. 25, 1984, 59-200153; Sep. 25, 1984, 59-200147

Int. Cl.[4] G11B *3/60*

U.S. Cl. 369—77.1 **7 Claims**



1. An automatic optical disc player of anti-shock type, which comprises:

a housing having an elongated slot;

a chassis member mounted within and on said housing via a first decoupling resilient means;

disc playback means accommodated within said housing; and

disc carrier means mounted direct on said chassis member for carrying a disc inserted into said slot between a start position close to said slot and a transfer position close to said playback means and for transferring and receiving said disc to and from said playback means,

said disc playback means including a support structure mounted on said chassis member via second decoupling resilient means, disc drive means rigidly mounted on said support structure for rotating said disc transferred thereto from said disc carrier means about a rotating axis, and optical pick-up means for reading a signal from said disc,

said pick-up means including a carriage assembly carrying thereon said optical pick-up device which emits a light beam and produces an electric signal converted from an optical signal contained in a reflected light beam returned thereto, guide assembly rigidly mounted on said support structure for guiding said carriage assembly along a radial direction of said rotating axis, and a positioning assembly connected to said carriage assembly for positioning said carriage assembly with respect to said support structure structure while urging said carriage assembly to move along said guide assembly,

said support structure being hung through said second resilient means from said chassis member.

4,695,997

DEVICE FOR PERFORMING WRAP TESTS ON A MULTIPLEX LINK IN A DATA COMMUNICATION SYSTEM

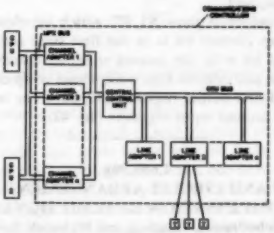
Gerard M. Montanari, Cagnes/Mer; Francis E. Baudelot, Nice, and Michel L. Costes, Cagnes/Mer, all of France, assignors to International Business Machines Corp., Armonk, N.Y.

Filed Jun. 14, 1985, Ser. No. 744,704

Claims priority, application European Pat. Off., Jun. 29, 1984, 84430023.6

Int. Cl.[4] H04J *1/16;* **H04M** *1/24*

U.S. Cl. 370—13 **1 Claim**



1. In a communication system for the bidirectional exchange of messages between a central process unit (CPU) and a time multiplexed link serving a number of remote terminals via a communication controller which includes a central control unit (CCU) connected to the CPU and to the time multiplex link via a line adapter (LA) having a line scanner, a device for performing wrap tests on the multiplex line within any given time slot comprising,

first means (2, 12) for setting a wrap control bit which is associated with the bits from the CPU to be transmitted within each time slot, to a first or to a second state indicating that the link is either in wrap test mode or in a normal mode of operation, and

second means (32, 51) including a logic circuit responsive to the state of said wrap control bit to cause the data bits received from the CPU to be returned to the CPU within those time slots during which said wrap control bit is in a first state ("0") or to cause the data bits received from the CPU to be sent over the multiplex link, and those received from the multiplex link to be sent to the CPU during those time slots within which said wrap control bit is in the second state ("1"), said second means includes:

first input registers (10 and 12) which receive from the line scanner, whenever a line is scanned, the bit to be transmitted over the scanned line and the associated control bits including said wrap control bit,

a memory (16) a storage area of which is allocated to each line and which receives, under the control of a transfer circuit (14), the contents of said first registers, so as to

assemble the data bytes to be transmitted during the time slots allocated to the lines,

first output registers (30, 32) the first of which receives at appropriate times, under the control of a transfer circuit (28) responsive to Frame Start Identification (F) and Signal Element Timing (S) signals from the multiplex link, the data bytes and the associated control bits from the storage areas of said memory,

second input registers (40 and 42) which receives from the multiplex link the data bits and the associated control bits,

a memory (48) a storage area of which is allocated to each line and whic receives within each time slot under the control of a transfer circuit (46) responsive to the Frame Start Identification and Signal Element Timing signals from the multiplex link, the data bits and the associated control bits,

second output registers (15, 17) which receives during each line scan period the content of said storage area through a transfer circuit (50) to thereby deserialize the bits received within each time slot and send said bits, one at a time, to the scanner whenever a line is scanned,

said logic circuit including:

a first set of gates (86, 84, 82, 80) which are closed when the wrap control bit is in said second state to send the data and control bits, except the wrap control bit, contained in said first output registers over the multiplex link and to transfer the bits received from the multiplex link to the second input register, and which are open when said wrap control bit is in said first state, and

a second set of gates (81, 87) which are closed when the wrap control bit is in the first state and open when said bit is in the second state, to thereby cause the data and control bits, except said wrap control bit, in said first output registers (30, 32) to be transferred to the second input registers (40, 42).

4,695,998

METHOD AND CIRCUIT ARRANGEMENT FOR THE COMPENSATION OF ECHO SIGNALS

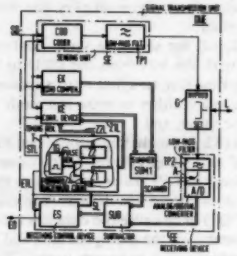
Gero H. J. Schollmeier, Gauting, and Heinrich Sailer, Neuried, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 26, 1984, Ser. No. 634,850

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327467

Int. Cl.[4] H04B *3/20*

U.S. Cl. 370—32.1 **10 Claims**



1. In a method for the compensation of echo signals in a signal transmission unit for the duplex transmission of digital signals which signal transmission unit is connected to a duplex channel arrangement with a two-wire line, which signal transmission unit includes a sending device and a receiving device, and in which signal transmission unit, compensation signals are generated by an echo compensator for the compensation of echo signals that are received in the receiving device of the signal transmission unit when digital signals are sent by the sending device of the signal transmission unit over the two-wire line where,

echo compensation signals are subtracted in the receiving device of the signal transmission unit from digital signals and the echo signals received in the receiving device at scanning times that occur in uniform time intervals, and, where

adjustment data are fed by the receiving device to a timing generator to regulate the phase position of clock pulses of a clock pulse sequence in predetermined phase grid steps which clock pulses determine by their occurrence the scanning times, the improvement in said method comprising the steps of:

(a) accumulating control data for shifting the phase position of the clock pulses by an amount determined by a phase grid step and maintaining a phase position that has been previously set;

(b) deriving correction signals based upon the accumulated control data and summing said correction signals with the echo compensation signals so that echo signals are substantially eliminated; and

(c) shifting the phase position of the clock pulses by only one phase grid step when the accumulated control data reaches a predetermined threshold.

4,695,999

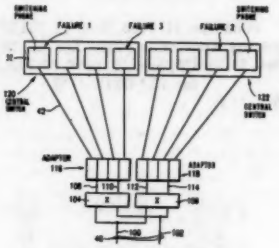
CROSS-POINT SWITCH OF MULTIPLE AUTONOMOUS PLANES

Gerald Lebizay, White Plains, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 624,881, Jun. 27, 1984, abandoned. This application Sep. 2, 1986, Ser. No. 903,862

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—58 **6 Claims**



1. A switching system for selectively connecting a plurality of users, comprising:

(1) a central switching station, said central switching station comprising a plurality of switching units, each of said switching units comprising a plurality of switching planes;

(2) a plurality of data links, each of said data links being coupled at a first end thereof to a respective one of said switching planes; and

(3) a plurality of user stations, each of said user stations comprising:

a. a plurality of switching adaptor means for dividing data messages to be transmitted to another user station onto a plurality of said data links and for receiving divided data messages on said data links and recombining said divided data messages, at least one of said adaptor means being provided for each of said switching units, each of said adaptor means comprising a plurality of sets of mini-adaptors, each of said mini-adaptors being coupled to a second end of a respective one of said data links; and

b. switching means for distributing data between internal data lines of said user station and selected ones of said

mini-adaptors of selected sets of mini-adaptors, only one mini-adaptor of any one set being selected at any one time;

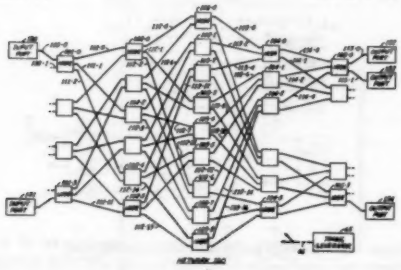
wherein failure of at least one switching plane within each of said switching units can occur without loss of bandwidth for message transmission between pairs of users connected through said central switching station and said bandwidth can be varied by selection of a number of sets of said mini-adaptors used for transmission.

4,696,000

NONBLOCKING SELF-ROUTING PACKET AND CIRCUIT SWITCHING NETWORK

William A. Payne, III, Lombard, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 12, 1985, Ser. No. 808,344
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—60 **10 Claims**



1. A non-blocking switching network for the communication of packets and circuit switched information from network input ports to network output ports, said network comprising:

a plurality of sequential broadcast stages followed by a plurality of routing stages;

a plurality of sequential links for sequentially interconnecting said stages;

each of said broadcast stages comprises a plurality of switch nodes each responsive to the receipt of address signals designating an output port received from one of said input ports for communicating the received address signals as a plurality of sets of said received address signals to all of the interconnected nodes of a subsequent one of said stages;

each of said routing stages comprises a plurality of switch nodes each comprises means responsive to receipt of a plurality of sets of said address signals for selecting one of said sets; and

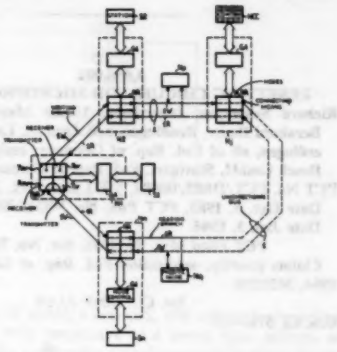
each of said switch nodes of said routing stages further comprises means responsive to the selected one of said sets of address signals for transmitting said one of said sets to the switch node in the subsequent stage designated by said address signals.

4,696,001

RECONFIGURABLE HIGH-SPEED INTEGRATED LOCAL NETWORK

Fabrizio Gagliardi, Turin; Livio Lambarelli, Turin; Gianfranco Panarotto, Turin; Daniele Roffinella, Moncalieri, and Maurizio Sposini, Valdellatorre, all of Italy, assignors to Cselt - Centro Studi e Laboratori Telecomunicazioni S.p.A., Turin, Italy

Filed Jan. 8, 1986, Ser. No. 817,031
Claims priority, application Italy, Mar. 6, 1985, 67229 A/85
Int. Cl.[4] H04J *3/14*
U.S. Cl. 370—88 **12 Claims**



1. Reconfigurable high-speed integrated local network comprising:

a unidirectional optical fiber line;

a plurality of stations, each of said plurality of stations forming a node, said node being selected from the group of bus-head node, folding-point node, bus-head-folding-point node, transit node, and passive node, said plurality of stations being connected by said line, said plurality of stations exchange through said line information coded and organized in hybrid frames having a first region assigned to circuit switched communications and a second region assigned to packet switched communications, whereby said line being bus folded, at said folding-point node, as to form a writing branch and a reading branch, said writing branch and said reading branch being active at the same time, wherein said writing branch begins and said reading branch ends at said bus-head node, if said folding-point node and said bus-head node are identical herein referred to as said bus-head-folding-point node, wherein at said transit node said line information being received via said writing branch is sent to a next node via said writing branch and said line information being received via said reading branch being sent to said next node via said reading branch, and wherein at said passive node there being no regeneration of said information, each of said plurality of stations comprising:

a connecting means for connecting and reconfiguring each of said plurality of stations to said line, wherein during regular network operations said bus-head node and said folding-point node are identical forming said bus-head-folding point node, whereby during a failure in said network, said connecting means isolates said failure in said network referred to as a failed component, wherein said connecting means reconfigures said bus-head-folding-point node to form said transit node and first adjacent station of said plurality of stations forming said folding-point node and second adjacent station of said plurality of stations forming said bus-head node, said connecting means for each of said plurality of stations being controlled locally at each of said plurality of stations, and

a line access means for line access handling an ordered access protocol for each of said plurality of stations in said first region and said second region, said protocol being based on physical position of said node and being such that each of said plurality of stations access said unidirectional optical fiber line, said line access means having a frame signal generator, which at least generates a start-of-frame signal, a region-boundary signal, a start-of-packet-round signal, wherein only said frame signal generator of said bus-head node being enabled.

4,696,002

RESETTING CIRCUIT FOR MICROPROCESSORS

Richard Schleupen, Ingersheim; Ulrich Mayer, Waiblingen; Bernhard Bauer, Renningen, and Arnd M. Langner, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

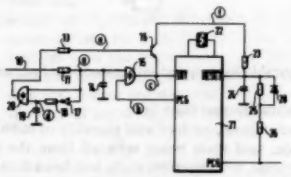
PCT No. PCT/DE85/00089, § 371 Date Oct. 3, 1985, § 102(e) Date Oct. 3, 1985, PCT Pub. No. WO86/00155, PCT Pub. Date Jan. 3, 1986

PCT Filed Mar. 20, 1985, Ser. No. 787,795

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1984, 3421584

Int. Cl.[4] G06F *11/04*

U.S. Cl. 371—12 **6 Claims**



1. In a reset circuit for a microprocessor, in particular for a micro-processor for controlling systems in motor vehicles, said microprocessor being cyclically fed from a system to be controlled by input signals fed at an input of said microprocessor, said microprocessor having an output at which output signals are emitted, the improvement comprising means for receiving and combining said input signals with said output signals, said means (17 to 20, 40 to 43, 50 to 55) being connected to said input and output, respectively, and generating reset signals for said microprocessor if a predetermined output signal at said output of the microprocessor does not follow a switching signal of the cyclically fed signals.

4,696,003

SYSTEM FOR TESTING INTERACTIVE SOFTWARE

Randal H. Kerr, Richford, and Robert M. Mesnard, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 10, 1986, Ser. No. 838,239

Int. Cl.[4] G06F *11/00*

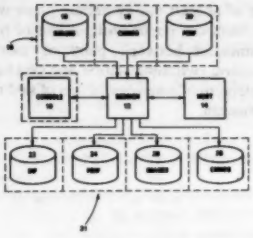
U.S. Cl. 371—19 **17 Claims**

1. A method for testing host resident interactive software, the steps comprising:

(a) executing a first version of host resident interactive software;

(b) capturing an interactive test case generated during said execution of said software;

(c) executing said test case on a second version of said interactive software, said second version of said intereactive software being different than said first versin thereof;



(d) detecting differences between said different versions of said interactive software; and

(e) presenting said differences.

4,696,004

LOGIC ANALYZER

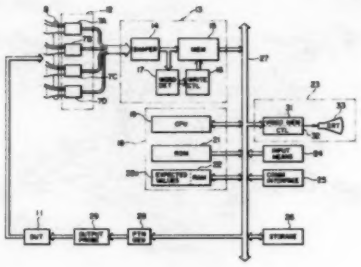
Takayuki Nakajima, Gyoda; Tetsuo Aoki, Kohnosu; Katsumi Kobayashi, Gyoda, and Noboru Akiyama, Kumagaya, all of Japan, assignors to Takeda Riken Kogyo Kabushikikaisha, Tokyo, Japan

Filed May 24, 1985, Ser. No. 737,466

Claims priority, application Japan, May 28, 1984, 59-108921; May 30, 1984, 59-110380

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—25 **12 Claims**



1. A logic analyzer for a circuit under test having plurality of output channels, comprising:

data storage memory means, coupled to the circuit under test, for sequentially storing a plurality of output data simultaneously obtained from the plurality of output channels of the circuit under test in response to respective input data supplied to the circuit under test;

expected value memory means for storing expected value data corresponding to the expected values of said output data;

comparison means, operatively connected to said data storage memory means and said expected value memory means, for comparing said output data from said data storage memory means with the corresponding expected value data stored in the expected value memory means;

code producing means for producing character codes of block elements each representing plural input and output bits being compared and indicating whether there is any mismatch in each block of a predetermined number of the data patterns;

display means, of a scanning type and including a display screen, for displaying dot patterns of block elements and characters on the display screen;

video memory means for storing character codes represent-

ing the respective block elements and characters at addresses corresponding to respective positions of display on said display screen and reading therefrom the character codes in synchronism with scanning of said display means;

dot pattern memory means having stored therein dot patterns of the block elements and characters, for receiving the character codes read out from said video memory means and reading out from said dot pattern memory means the dot patterns of the block elements and characters using the character codes as addresses; and

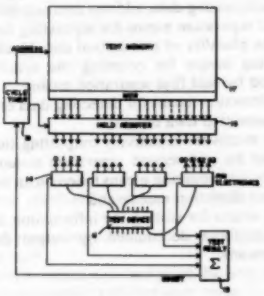
control unit means for writing the character codes of the block elements and characters into said video memory means at the addresses corresponding to the positions on said display screen such that the block elements are displayed in matrix form and the characters are displayed around the matrix on said display sceen.

4,696,005

APPARATUS FOR REDUCING TEST DATA STORAGE REQUIREMENTS FOR HIGH SPEED VLSI CIRCUIT TESTING

Ernest H. Millham, Catlett, Va.; John J. Moser; John J. Shushereba, both of Essex Junction, and Gary P. Visco, Hinesburg, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,592
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—27 **9 Claims**



1. In an automatic testing system, apparatus for supplying test data for a plurality of test cycles identifying test conditions for a multipin electronic circuit, comprising:

a random access memory having a plurality of higher order addresses identifying a plurality of memory rows containing a complete field of test data, some of said rows containing an operational code specifying a number of subsequent test cycles over which a minority of data in said rows are to change without changing the remaining data of the row, and having a smaller number of lower order addresses which contain data in the same position within the data field as said minority of data;

means for sequentially addressing each of said higher order addresses;

a repeat buffer for sequentially addressing said lower order addresses;

a hold register for receiving each row of addressed data in said memory and for outputting test data identifying test conditions for a multipin electronic circuit; and

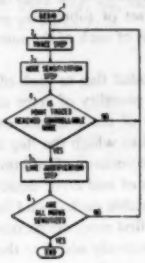
processor means for indexing said means for sequentially addressing said higher order addresses and decoding each operational code received in said holding register, said processor connected to inhibit addressing by said means for sequentially addressing said higher order addresses and addressing said repeat buffer for a number of test cycles identified by said operational code whereby only said minority of data bits in said holding register having a field position corresponding to data bits in said lower order memory address change.

4,696,006

METHOD OF GENERATING TEST PATTERNS FOR LOGIC NETWORK DEVICES

Masato Kawai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 25, 1985, Ser. No. 802,114
Claims priority, application Japan, Nov. 26, 1984, 59-248244
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—27 **13 Claims**



1. A method of testing a network, said network comprising a controllable node responsive to a given input pattern, an operator node for performing a predetermined function for the input pattern, an observable node for observing an output of the operator node and signal path segments for connecting the nodes, said method including the steps of:

tracing a path from said observable node to said controllable node through operator node;

determining a sensitizing condition for sensitizing said traced path;

generating an input pattern sequence for sensitizing said traced path, said input pattern sequence comprising at least first and second input patterns provided at different times;

applying said generated patterns to said network: and

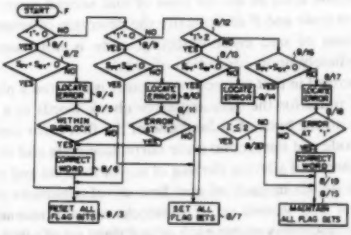
examining outputs of said network to determine the existence of faults in said network.

4,696,007

METHOD OF CORRECTING ERRORS IN BINARY CODED WORDS

Yoshiaki Moriyama, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 19, 1985, Ser. No. 756,687
Claims priority, application Japan, Jul. 20, 1984, 59-150765
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—37 **9 Claims**



1. A method of correcting errors in binary coded words

organized in a word block consisting of a plurality of data words and a plurality of error check words and consisting of a plurality of subblocks which can be selectively grouped on the basis of one of three different criteria to form one of three different sets of subblocks which consist of first, second and third sets of subblocks wherein, if at least two of the data words and error check words in said word block are included in one of said first, second and third subblocks, said at least two of the data words and error check words could not be concurrently included within each of the other subblocks, comprising

generating a first error correction code on the basis of each of the subblocks in said first set of subblocks, a second error correction code on the basis of each of the subblocks in said second set of subblocks, and an error detection code on the basis of each of the subblocks in said third set of subblocks,

adding a binary coded flag to each of said plurality of data words and said plurality of error check words, said flag being indicative of the presence or absence of an error within the word to which the flag is added,

detecting errors within each of said third set of subblocks on the basis of each of said error detection codes,

correcting errors within each of said first set of subblocks on the basis of said first error correction code with reference to the flags respectively added to the words in each of the subblocks and correcting errors within each of said second set of subblocks on the basis of said second error correction code with reference to the flags respectively added to the words in each of the subblocks,

altering the flag of any of the data and error check words in each of said first set of subblocks each time the correction of errors within each of said first set of subblocks is complete and altering the flag of any of the data and error check words in each of said second set of subblocks each time the correction of errors within each of said second set of subblocks is complete thereafter so that, each time the flag is altered, the flag is indicative of the absence of an error if a word being checked for an error is unlikely to contain an error and indicative of the presence of an error if the word being checked for an error is likely to contain an error or is likely to fail to be detected to be in error,

altering the flag of any of the data and error check words if the flag has remained unaltered after the correction of errors on the basis of said first error correction code or on the basis of said second error correction code and if additionally the detection of errors on the basis of said error detection code is executed immediately upon correction of errors, and

maintaining the flag of any of the data and error check words so that the flag maintained coincides with the flag added to the word being checked for an error before the word was corrected if the flag has remained unaltered after the correction of errors on the basis of said first error correction code or on the basis of said second error correction code and if additionally the detection of errors on the basis of said error detection code is not executed immediately upon correction of errors,

characterized in that correction of errors is effected a plurality of times for the data and error check words in a subblock on the basis of at least one of the first error correction code and the second error correction code and in that the manner of altering the flag of any of the data and error check words in each of said first set of subblocks or in each of said second set of subblocks and the manner of correcting errors within each of said third set of subblocks are varied depending upon the numbers of times the correction of errors is repeated.

4,696,008

DATA STORING DEVICE HAVING POSITION DETERMINING MEANS

Masahiro Takei, Kanagawa; Susumu Kozuki, Tokyo; Toshiyuki Masui; Masahide Hirasawa, both of Kanagawa, and Motokazu Kashida, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha

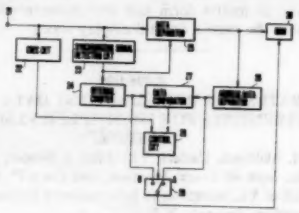
Filed Nov. 28, 1984, Ser. No. 675,766

Claims priority, application Japan, Dec. 2, 1983, 58-228689; Dec. 2, 1983, 58-228690

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—47

9 Claims



1. A data storing device comprising:

(a) first separation means for separating synchronizing data from a plurality of transmitted data blocks each including the synchronizing data, address data and information data;

(b) second separation means for separating the address data from the plurality of transmitted data blocks;

(c) counting means for counting the synchronizing data separated by said first separation means;

(d) error detection means for detecting data errors in each of said transmitted data blocks;

(e) output means for selectively outputting the address data separated by said second separation means or data produced by said counting means based on an output signal of said error detection means; and

(f) storing means for storing the information data in a memory at positions determined by output data from said output means.

4,696,009

METHOD AND ARRANGEMENT FOR PRODUCING ULTRASHORT LIGHT PULSES

Karl-Ernst Süse, 1, Hermann-Matern-Strasse, 6902 Jena-Lobeda, and Frank Weidner, No. 20b, 6901 Löbschütz, No. 20b, District of Gera, German Democratic Rep.

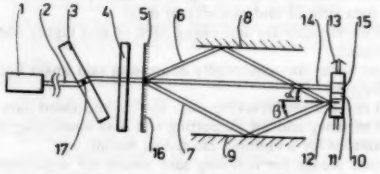
Filed Nov. 25, 1985, Ser. No. 806,890

Claims priority, application German Democratic Rep., Dec. 27, 1984, 2718100

Int. Cl.[4] H01S *3/10*

U.S. Cl. 372—25

11 Claims



4. Device for producing ultrashort light pulses comprising

a pumping radiation source for emitting a substantially coherent bundle of radiation,

means for focusing said coherent bundle of radiation and for producing therefrom first, second and third partial bundles of coherent radiation,

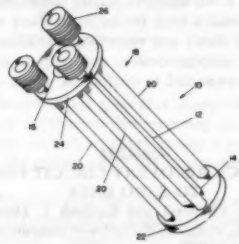
first deviating means,
second deviating means,
a laser active material,
said first deviating means and said second deviating means being arranged to direct said first partial bundle and said second partial bundle, respectively, for superimposition of said first and said second partial bundle and for interference pattern formation in a first range of said laser active medium for producing laser radiation therein, means for directing said third partial bundle upon a second range in said laser active medium through which said laser radiation passes
means for mutually displacing said first and said second ranges, and means for adjusting the energy of said first two partial bundles with respect to the energy in said third partial bundle.

4,696,010

THERMALLY STABILIZED LASER CAVITY

George Y. Eastman, Lancaster, Pa., assignor to Thermacore, Inc., Lancaster, Pa.

Filed Jul. 16, 1986, Ser. No. 886,169
Int. Cl.[4] H01S *3/04*
U.S. Cl. 372—34 **8 Claims**



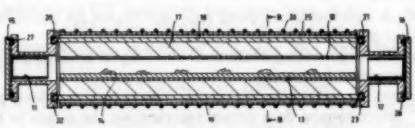
1. A temperature stabilized laser cavity support structure comprising:
at least two heat pipes functioning as structural elements in a laser cavity; and
thermal stabilization means attached to all the heat pipes and furnishing a heat transfer path between them to maintain the heat pipes at essentially the same temperature.

4,696,011

LASER DEVICE EMPLOYING A POROUS MATERIAL IN THE DISCHARGE CHAMBER

Andrew J. Kearsley, Oxford, England, assignor to Oxford Lasers Limited, Oxford, England

Filed Oct. 18, 1985, Ser. No. 788,976
Claims priority, application United Kingdom, Oct. 18, 1984, 8426319
Int. Cl.[4] H01S *3/03*
U.S. Cl. 372—61 **16 Claims**



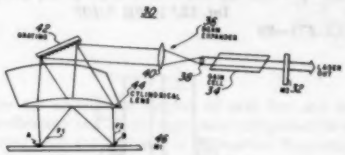
1. A laser device comprising
a hollow elongated element, the interior of said element forming a discharge chamber;
a lasing medium contained within said chamber;
means for producing within said chamber conditions for stimulated emission of said medium; and
a porous material extending along at least a major portion of the length of the interior of said hollow elongated element, a portion of said lasing medium being vaporized when said conditions for stimulated emission exist within said chamber and the remainder thereof being molten, the molten portion of said lasing medium being absorbed into said porous material and retained therein without allowing conduction therethrough along the length of said chamber.

4,696,012

TUNABLE MULTILINE/MULTIBAND LASER

Robert C. Harshaw, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 11, 1985, Ser. No. 743,545
Int. Cl.[4] H01S *3/08*
U.S. Cl. 372—99 **14 Claims**



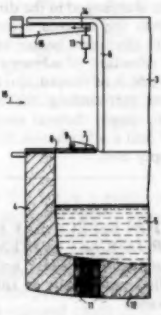
1. A tunable multiline/multiband laser comprising a partial reflecting mirror, gain cell, splitting means and a mirror means constituting an optical path, the splitting means for spatially separating initially parallel rays of different wavelengths originating from the gain cell and projecting the spectrum onto the surface of the mirror means operable for normalizing the round trip gain of each frequency component.

4,696,013

VESSEL OF A METALLURGICAL FURNACE, ESPECIALLY OF AN ARC FURNACE

Joachim Ehle, Lautenbach; Gerhard Fuchs, Kehl-Bodersweier; Klaus Kimmer, Willstätt, and Horst-Rüdiger Langfeldt, Baden-Baden, all of Fed. Rep. of Germany, assignors to Fuchs Systemtechnik GmbH, Willstätt-Legelshurst, Fed. Rep. of Germany

Filed Sep. 10, 1986, Ser. No. 905,494
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533755; Nov. 27, 1985, 3541873; Mar. 10, 1986, 3607906
Int. Cl.[4] F27D *1/00, 3/00*
U.S. Cl. 373—71 **30 Claims**



1. A furnace vessel of a metallurgical furnace, in particular an electric arc furnace comprising:
(a) a lower vessel, oval in plan, for accommodating a molten metal bath and having a refractory lining, a floor, and a tap hole disposed eccentrically in the floor; the tap hole

being arranged within the lower vessel in the region of the longitudinal axis of the oval in the vicinity of the wall of the vessel;

(b) an upper vessel formed from fluid-cooled wall elements and having a lower edge which is fitted on to an upper edge of the lower vessel; the upper vessel, above the tap hole, including an upper vessel portion which is displaced relative to the lower vessel towards the center of the vessel; and

(c) a maintenance opening located above the tap hole in said upper vessel portion and closable by a cover.

4,696,014

SELF-BAKING ELECTRODES

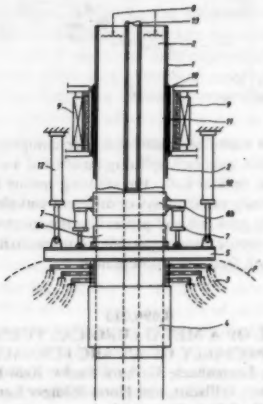
Bengt Orrling, Linköping, Sweden, assignor to ASEA Aktiebolag, Västerås, Sweden

Filed Sep. 22, 1986, Ser. No. 909,924

Claims priority, application Sweden, Sep. 25, 1985, 8504425

Int. Cl.[4] H05B 7/107

U.S. Cl. 373—89 **9 Claims**



1. Apparatus for producing a consumable electrode, for use in a melting or reduction are furnace, from an electrode paste contained in a metallic casing and for supplying electrical current to the electrode by means of at least one current supply unit,

the improvement wherein

an electrode heater is arranged in the direction of advance of the electrode into the furnace upstream of the current supply unit, said electrode heater being arranged to be moved in said direction of advance with the electrode when the electrode is advanced into the arc furnace, said electrode heater surrounding the electrode paste and being adapted to supply thermal energy to the electrode paste to bake it into a selfcoherent form before it reaches the current supply unit.

4,696,015

ECHO CORRECTION ESPECIALLY FOR TELEVISION BROADCAST SYSTEMS

Jacques P. Palicot, and Guy P. Dublet, both of Rennes, France, assignors to Etablissement Public de Diffusion dit Telediffusion de France, France

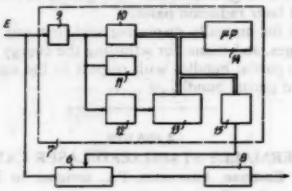
Filed Oct. 19, 1984, Ser. No. 662,961

Claims priority, application France, Oct. 28, 1983, 83 17438

Int. Cl.[4] H03H 7/30; H03D 1/06

U.S. Cl. 375—14 **9 Claims**

1. A digital transmission echo analog cancellation apparatus for cancelling echoes in received video analog signals, the cancellation apparatus comprising analog transversal filter means and computing circuit means for generating direct coefficients a1–ar and recursive coefficients b1–bm of the analog transversal filter, a signal input of said computing circuit means being coupled to a signal input of the analog transversal filter means, the computing circuit means comprising an analog-to-digital converter having an output which is coupled to a self-adaptive digital transversal filter that includes a mean calculating circuit, sample memory means coupled to said analog-to-digital converter means for storing output samples from the



analog-to-digital converter, microprocessor means and buffer memory means interconnected by data bus means, the microprocessor being coupled to operate and control the computing circuit means as a self-adaptive digital transversal filter with decisions made inside a loop, the buffer memory means storing those of the said direct and recursive coefficients which are selected by the microprocessor, and outputs of said buffer memory means connected to coefficient inputs of the analog transversal filter.

4,696,016

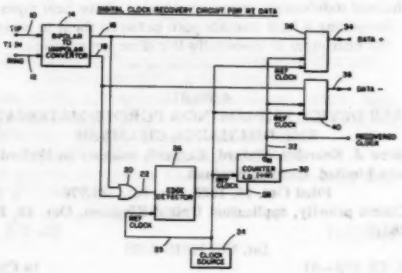
DIGITAL CLOCK RECOVERY CIRCUIT FOR RETURN TO ZERO DATA

John G. Rozema, Elmhurst, and Kenneth A. Thompson, Lockport, both of Ill., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 2, 1986, Ser. No. 914,688

Int. Cl.[4] H04L 7/02

U.S. Cl. 375—20 **11 Claims**



10. A data-rate clock pulse recovery circuit for use with a bipolar digital data stream comprising:

means for providing a reference clock signal having a predetermined frequency;

means for converting the bipolar data stream to at least one return-to-zero data stream representing the pulses in the bipolar data stream;

means for detecting the next positive going edge of said reference clock signal after detecting a positive going edge of the pulse of said return-to-zero data stream, said means for detecting, receiving said return-to-zero data stream and said reference clock signal and producing an edge detected data stream; and

means for counting, receiving said edge detected data stream

and said reference clock signal to produce a recovered clock signal;

wherein said means for counting skips or repeats a state when the phase of said return-to-zero data stream drifts.

4,696,017

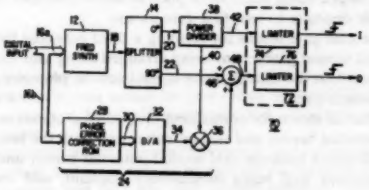
QUADRATURE SIGNAL GENERATOR HAVING DIGITALLY-CONTROLLED PHASE AND AMPLITUDE CORRECTION

Michael S. Masheff, and David E. Sanders, both of St. Petersburg, Fla., assignors to E-Systems, Inc., Dallas, Tex.

Filed Feb. 3, 1986, Ser. No. 825,478

Int. Cl.[4] H04L *25/49*

U.S. Cl. 375—60 **11 Claims**



1. A quadrature signal generator, comprising:

a frequency synthesizer for receiving an input signal and generating an output signal having a predetermined frequency, the output signal having amplitude error components;

a splitter for receiving the output signal and generating an in-phase (I) signal and a quadrature phase (Q) signal at the predetermined frequency, the in-phase and quadrature phase signals having a substantially 90° phase difference;

a table look-up memory for receiving the input signal as an address input and in response thereto generating a digital correction word;

digital-to-analog conversion means for receiving the digital correction word and in response thereto generating a predetermined phase correction signal;

means for receiving the phase correction signal and the in-phase signal and in response thereto generating a phase error correction signal;

means for adding the phase error correction signal to the quadrature phase signal to correct the phase error; and

amplitude correction means for receiving the in-phase and phase error corrected quadrature-phase signals for correction of the amplitude error components.

4,696,018

DIGITAL FM DETECTOR FOR DIGITIZED FM SIGNALS

Edmund Zaehringer, Bad Krozingen; Peotr Baker, Allington, and Rolf Zettel, Denzlingen, all of Fed. Rep. of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed Dec. 21, 1984, Ser. No. 684,717

Claims priority, application European Pat. Off., Dec. 24, 1983, 83113112

Int. Cl.[4] H03D *3/18*; H04L *27/06*

U.S. Cl. 375—82 **8 Claims**

1. A digital FM detector for FM signals digitized by means of a first sampling signal, said detector comprising:

a sample and hold circuit receiving said digitized FM signals and having an output;

a first sampling stage coupled to said sample and hold circuit output and clocked by a second sampling signal at a frequency which is an integral multiple of the frequency of the first sampling signal;

a digital interpolating filter having an input coupled to said first sampling stage, and being clocked by said second sampling signal;

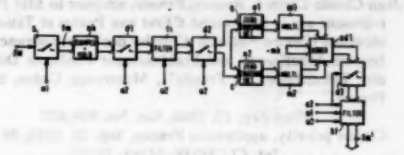
a second sampling stage coupled to said digital interpolating filter and clocked by said second sampling signal;

a first zero crossing detector for detecting positive going zero crossings coupled to said second sampling stage;

a first group delay controlled multivibrator coupled to the output of said first zero-crossing detector;

a second zero-crossing detector for detecting negative going zero crossings coupled to said second sampling stage;

a second group delay controlled multivibrator coupled to the output of said second zero-crossing detector;



an adder for adding the outputs of said first and second multivibrators and an average-value compensation signal identical with the quotient of the carrier frequency and the maximum possible frequency of the analog FM signals;

a third sampling stage having its intput coupled to the output of said adder and clocked by said second sampling signal, a digital conversion filter coupled to the output of said third sampling stage and clocked by said first and second sampling signals and a third sampling signal having a frequency which is a submultiple of said second sampling signal frequency.

4,696,019

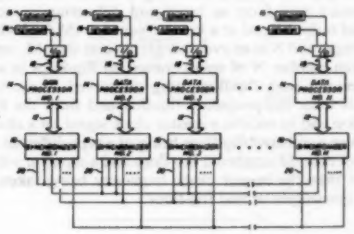
MULTI-CHANNEL CLOCK SYNCHRONIZER

Bhalchandra R. Tulpule, Vernon; Edward M. Oscarson, Bristol, and David J. Voegien, Meriden, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 19, 1984, Ser. No. 652,028

Int. Cl.[4] H04L *7/00*; G05B *15/08*

U.S. Cl. 375—107 **13 Claims**



1. A synchronizer for use in a multi-channel system, each channel having an oscillator and a synchronizer associated therewith, the oscillator for providing clock pulse signals at a selected clock frequency, comprising:

counter means, responsive to clock pulse signals for counting clock pulses and providing a frame output signal pulse upon reaching a selected clock pulse count, said counter means providing said frame output signal pulse at a selected frame frequency equal to the quotient of the selected clock frequency divided by said selected clock pulse count, said counter means also responsive to an input voted frame sync signal pulse from a selected synchronizer within the channel associated with said counter means for resetting said counter means' count; and

voter means, responsive between occurrences of sasid input voted frame sync signal pulse to a plurality of incoming

counter frame output signal pulses, one counter frame output signal pulse from each of the channels in the system, for providing an output voted frame sync signal pulse upon or after reception of a selected number of separate counter frame output signal pulses, each of said separate pulses from a different channel in the system.

4,696,020

DIGITAL CIRCUIT FOR FREQUENCY OR PULSE RATE DIVISION

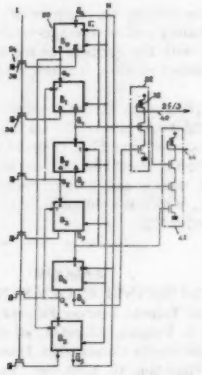
Jean-Claude Carlach, Rennes, France, assignor to Etat Francais represent par le Secretariat d'Etat aux Postes et Telecommunications (Centre National d'Etudes des Telecommuncations), Issy les Moulineaux and Etablissement Public de Diffusion, dit "Telediffusion de France" , Montrouge Cedex, both of, France

Filed Sep. 17, 1986, Ser. No. 909,027

Claims priority, application France, Sep. 19, 1985, 85 13914

Int. Cl.[4] H03K *23/48, 23/52*

U.S. Cl. 377—48 **9 Claims**



1. Digital circuit for receiving a master clock signal at a frequency rate f on an input and delivering a rectangular shaped output signal at a lower frequency (M/N)f where M is an integer and N is an even integer greater than M, comprising an even number N of series connected flip-flops in a ring arrangement, each flip-flop being connected to receive input signals from the preceding flip-flop and from the following flip-flop and to receive a master clock signal on a clock input, the even numbered flip-flops being of a type different from the type of the odd numbered flip-flops and a signal at a frequency lower than the master clock frequency being taken from at least one output of said flip-flops.

4,696,021

SOLID-STATE AREA IMAGING DEVICE HAVING INTERLINE TRANSFER CCD MEANS

Atsushi Kawahara, and Norihiko Takatsu, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation of Ser. No. 499231, May 31, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 884,865

Claims priority, application Japan, Jun. 3, 1982, 57-93987; Aug. 31, 1982, 57-150122

Int. Cl.[4] G11C *19/28;* **H01L** *29/78, 27/14, 31/00*

U.S. Cl. 377—58 **2 Claims**

1. A solid-state area imaging device having first and second stripe-shaped light intensity detecting means arranged adjacent to a predetermined plane, each of said light intensity detecting means comprising:

(a) a plurality of photosensitive elements each having a photosensitive surface arranged near said predetermined plane so as to produce an amount of electric charge corresponding to an intensity of light received by said photosensitive surface, said plurality of photosensitive elements being arranged in a row;

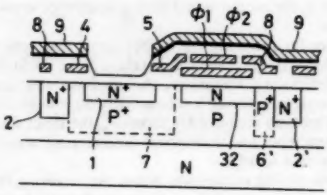
(b) drain means for draining a portion of said charges produced by said plurality of photosensitive elements, said drain means being arranged along said row of said plurality of photosensitive elements;

(c) first gate means for forming a first potential barrier, said first gate means being arranged between said drain means and said row of said plurality of photosensitive elements;

(d) transfer means for storing charges and then transferring said charges to outside of said device, said transfer means forming a second potential barrier and a potential well whereby the potential of said second potential barrier is higher than the potential of said potential well and being arranged along said row of photosensitive elements on the side opposite to said first gate means;

(e) second gate means for forming a third potential barrier, said second gate means being arranged along said transfer means on the side opposite to said row of photosensitive elements; and

(f) control means for controlling the potential of said second potential barrier and said potential well with the potential difference between said second potential barrier and said potential well being substantially constant, said control



means having first, second and third control states, said potential well being arranged between said second potential barrier and said third potential barrier,

wherein said control means controls the potential of said second potential barrier whereby the potential of said second potential barrier is lower than the potential of said first potential barrier and said third potential barrier and said transfer means stores charges produced by said plurlaity of photosensitive elements in said potential well when said control means is in said first control state,

said control means controls the potential of said second potential barrier and said potential well whereby the potential of said second potential barrier is higher than the potential of said first potential barrier and the potential of said potential well is lower than the potential of said third potential barrier and said transfer means transfers charges to outside of said device when said control means is in said second control state, and

said control means controls the potential of said potential well whereby the potential of said potential well is not less then the potential of said third potential barrier and said transfer means of one light intensity detecting means transfers charges therein to said drains means of the other light intensity detecting means when said control means is in said third control state.

4,696,022

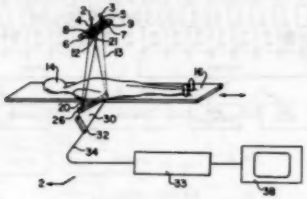
STEREOSCOPIC RADIOGRAPHY APPARATUS AND METHOD

Donald Sashin, Pittsburgh, Pa., and Ernest J. Sternglass, Bloomington, Ind., assignors to University of Pittsburgh, Pittsburgh, Pa.

Filed Jan. 27, 1984, Ser. No. 574,588

Int. Cl.[4] A61B 6/02

U.S. Cl. 378—41 **27 Claims**



1. Stereoscopic radiography apparatus comprising

radiation source means for generating substantially simultaneously a first radiation beam and a second radiation beam,

collimator means interposed between said radiation source means and an object to be exposed to radiation for converting said first and said second radiation beams into generally fan-shaped beams,

radiation detector means disposed on the opposite side of said object from said radiation source means for converting the portion of said first and second radiation beams passing through said object into responsive electrical signals, containing first image information from said first beams and second image information from said second beams, and

signal receiving means operatively associated with said radiation detector means to store, process or display said image information

said radiation detector means includes scintillator means and an array of solid-state detector means,

said scintillator means adapted to convert said radiation into light,

said array of solid-state detector means adapted to receive said light from said scintillator means and emit a responsive electrical signal, and

fiber optic coupling means operatively associated with said scintillator means and said solid-state detector means for delivering light emitted by said scintillator means with substantial continuity to said array of solid-state detector means.

4,696,023

PROCEDURE AND MEANS FOR MEASURING WITH AID OF AN X-RAY TUBE THE DISTRIBUTION OF FILLERS OR EQUIVALENT IN A WEB

Juhani Kuusi, Helsinki, Finland, assignor to Robotest Oy, Finland

PCT No. PCT/FI83/00076, § 371 Date Jul. 30, 1984, § 102(e) Date Jul. 30, 1984, PCT Pub. No. WO84/02191, PCT Pub. Date Jun. 7, 1984

PCT Filed Nov. 30, 1983, Ser. No. 638,472

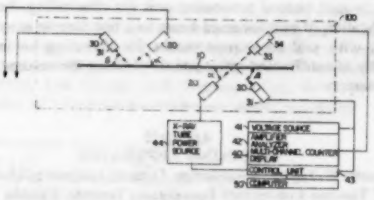
Claims priority, application Finland, Dec. 1, 1982, 824142

Int. Cl.[4] G01N 22/223, 33/34

U.S. Cl. 378—46 **29 Claims**

1. A method of measuring, without destroying the specimen, the distribution in the thickness direction of the filler and/or coating materials of paper or cardboard, and the content of said materials, wherein radiation emitted by an X-ray tube is used to excite in the material component to be examined, of the object of measurement, its characteristic X-ray radiation, the intensity of said characteristic radiation being observed, measurements are made on both sides of the paper or cardboard under examination, the contents of said materials are determined by X-ray absorption measurements for eliminating the effects of these components disturbing the distribution measurement, and measurement is made of the base weight of the paper or cardboard under examination by radiation absorption, said method comprising the steps of

making a number of X-ray absorption measurements, the number of measurements being at least equal to the number of different filler components, for determining the



contents of the different filler components and the coating materials by means of constant energy X-ray radiation;

making a number of measurements of the characteristic X-ray fluorescent radiation of the material components excited via the X-ray tube of the paper or cardboard; and

determining the distributions of fillers and coating materials by calculative joint processing of the results from said measurements.

4,696,024

METHOD AND APPARATUS FOR DETECTING FLAWS IN SINGLE CRYSTAL TEST SAMPLES

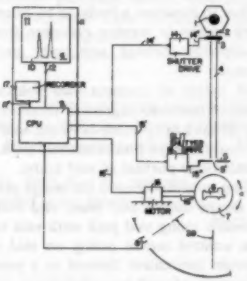
Wilfried Pesch, Munich, Fed. Rep. of Germany, assignor to MTU Motoren- und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,453

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 3439471

Int. Cl.[4] G01N 23/207

U.S. Cl. 378—73 **4 Claims**



1. An apparatus for inspecting single crystal test samples for flaws, comprising a radioactive source of gamma rays for passing gamma rays through said test sample, collimator means operatively connected to said source of gamma rays for providing a focussed beam of gamma rays, shutter means arranged for cooperation with said collimator means for controlling a timed application of said focussed beam to a test sample, movement means for providing a relative movement between said source of gamma rays and said test sample so that the test sample is exposed to said focussed beam, stationary detector means located relative to said movement means for detecting an intensity profile of a diffracted reflection of said focussed beam of gamma rays which pass through said sample, and a central processing unit including measuring means operatively connected to said detector means for measuring the half peak

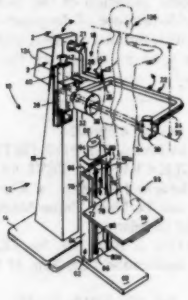
width of said reflection as an indication of a flaw in said test sample, wherein said collimator means comprise a tubular collimator for focussing said gamma rays, said shutter means comprising a first shutter located at one end of said tubular collimator facing said source of gamma rays, and a second shutter in the form of a slit stop at an opposite end of said tubular collimator, first drive means (14) for operating said first shutter, second drive means (15) for operating said second shutter, means connecting said first and second drive means also to said central processing unit for controlling the timed application of said focussed beam to a test sample in synchronism with said movement means for detecting an intensity profile of a diffracted reflection throughout the volume of said test sample.

4,696,025

SCANNING APPARATUS

Kenneth W. Taylor, Mississauga, Canada, assignor to University of Toronto Innovations Foundation, Toronto, Canada

Filed Jun. 2, 1986, Ser. No. 870,316
Int. Cl.[4] G21K *5/10*
U.S. Cl. 378—146 **11 Claims**



1. Radiological examination apparatus comprising a source of radiation to irradiate a body to be examined;

imaging means to receive radiation from said source after transmission through said body and provide an image thereof;

support means to connect said source and said imaging means to maintain alignment therebetween whilst permitting relative movement between said imaging means and said body along a predetermined path to provide a scan of an enlongate portion of said body;

recording means to record the image provided by said imaging means during said scan, said recording means being moveable along said path with said imaging means, and

motion control means acting on said recording means to maintain movement thereof in a predetermined ratio to movement of said imaging means relative to said body whereby the length of the image on said recording means is less than the distance moved by said imaging means relative to said body.

4,696,026

MULTIPLEXED TERMINAL FOR MONITORING AND CONTROLLING A PLURALITY OF REMOTE TELEPHONE SWITCHES

Donald A. Plouff, Nobelsville, Ind., assignor to General Telephone Company of Indiana, Westfield, Ind.

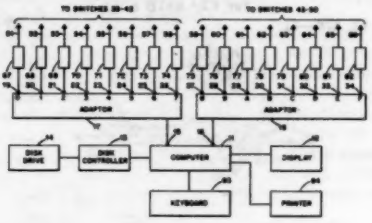
Filed Apr. 30, 1986, Ser. No. 858,474
Int. Cl.[4] H04M *3/24*
U.S. Cl. 379—34 **1 Claim**

1. A multiplexed terminal for continuously displaying the status of a plurality of remotely located stored program control telephone switches having remote control and display ports, said multiplexed terminal comprised of:

a computer having at least one I/O port;

first means coupled to said I/O port for providing a plurality of extended I/O ports;

means for coupling said extended I/O ports to dedicated



channels for communication with remote control and display ports of remotely located stored program control telephone switches; and

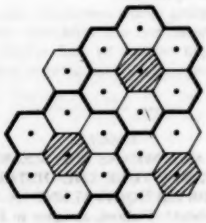
software means for controlling said computer, to multiplex said extended ports, and to simultaneously display clusters of data corresponding to the status and identification of each of said switches.

4,696,027

HANDOFF APPARATUS AND METHOD WITH INTERFERENCE REDUCTION FOR A RADIO SYSTEM

Jeffrey D. Bonta, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 1, 1986, Ser. No. 893,116
Int. Cl.[4] H04Q *7/04*
U.S. Cl. 379—60 **25 Claims**



1. A method of interference reduction in a multichannel two way radio system having at least two geographic radio coverage areas established by a fixed site apparatus in each coverage area and a plurality of remote stations, each remote station capable of transmitting at one of a plurality of power levels and capable of being handed off from one coverage area to another, comprising the steps of:

calculating a power level for a remote station transmitting to fixed site apparatus in a first coverage area which will produce a received signal level of a predetermined magnitude at fixed site apparatus in a second coverage area; and

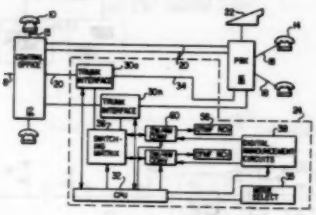
communicating said power level to said transmitting remote station during a handoff of said transmitting remote station from said first coverage area to said second coverage area.

4,696,028

PBX INTERCEPT AND CALLER INTERACTIVE ATTENDANT BYPASS SYSTEM

Sanford J. Morganstein, Elgin, Ill.; Edward F. Tuck, West Covina, Calif.; Bakulesh A. Mehta, Bolingbrook, and Herbert B. Krakau, Elmhurst, both of Ill., assignors to Dytel Corporation, Schaumburg, Ill.

Filed Mar. 26, 1984, Ser. No. 593,526
Int. Cl.[4] H04M *3/50, 7/14*
U.S. Cl. 379—88 **48 Claims**



7. A call processor for use in conjunction with a telephone switching system having provisions for a call completion assistant, for processing concurrent incoming calls directed to the switching system and allowing calling parties to choose whether to complete the calls directly to destinations associated with the switching system, or by the call completion assistant, comprising:

a plurality of extension telephone station lines for connecting said call processor to the telephone switching system;

detector means for detecting requests for service from the respective calling parties initiating calls to the telephone switching system;

means responsive to the detection of the requests for service by said detector means for causing respective connection paths to be established to the calling parties;

message announcement means for generating a message for transmission to the calling parties on said respective connection paths while the parties are placing concurrent calls;

means responsive to said detector means detecting said requests for service for transmitting said message to the calling parties;

means adapted for receiving a plurality of numbers input by the calling parties while said message is being transmitted to the calling parties; and

means responsive to a first type of response from the calling parties for receiving and for transferring respective destination determining information to the switching system, and responsive to a second type of response from the calling parties for transferring respective destination determining information associated with the call completion assistant to the switching system such that calls by the calling parties can be completed according to the respective said first or second types of responses, at the calling parties' options.

4,696,029

TELEPHONE TRAFFIC LOAD CONTROL SYSTEM

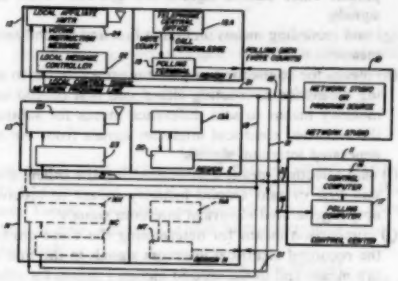
Fred Cohen, Philadelphia, Pa., assignor to Telesciences, Inc., Mount Laurel, N.J.

Filed Dec. 12, 1985, Ser. No. 808,249
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—92 **17 Claims**

1. A system for controlling the initiation of telephone calls responsive to a message broadcast by a broadcast station having a transmitter by controlling message generators at the broadcast station through a control center which receives real-time feedback of telephone traffic data from polling terminals at telephone central offices and utilizes this information to regulate stimuli broadcast by the station, comprising in combination,

(a) message generator means operatively coupled to the broadcast station signal transmitter and effective responsive to control means to cause a specific message to be broadcast,

(b) at least one polling terminal connected to a telephone system central office and operative to receive incoming calls on a plurality of discrete telephone lines, said terminal including means for recording the number of calls received on said plurality of telephone lines and means for recording and storing each instance when all of such plurality of telephone lines are in a "busy" condition,



(c) polling means for interrogating said at least one polling terminal to determine the "busy" condition thereof,

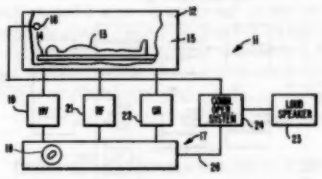
(d) control means operatively coupled to said message generator means and to said polling means and receiving information from the latter regarding the "busy" condition of said at least on polling terminal, said control means including decision making means responsive to the said information received from said polling means effective to control the rate or duration of the message caused to be broadcast by said message generator means, whereby, the rate of initiation of telephone calls responsive to the broadcaast message may be regulated.

4,696,030

PATIENT OPERATOR INTERCOM ARRANGEMENTS FOR MAGNETIC RESONANCE IMAGING SYSTEMS

Avihay Egozi, Netanya, Israel, assignor to Elscint Ltd., Haifa, Israel

Filed Dec. 16, 1987, Ser. No. 809,248
Int. Cl.[4] H04M *9/00*; H04B *15/00*
U.S. Cl. 379—167 **7 Claims**



1. A patient intercom arrangement for transmitting intercom signals in magnetic resonance imaging (MRI) systems and enabling a patient to speak to an operator during scan procedures that use gradient pulses, said intercom arrangement substantially eliminating gradient noise interference with intercom signals, said intercom arrangement comprising:

(a) microphone means in the vicinity of the patient for converting audio signals into electrical intercom signals;

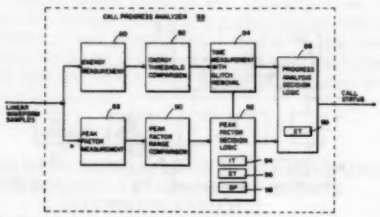
(b) loudspeaker means in the vicinity of the operator for converting the electrical intercom signals to audio signals;
(c) operating circuit means coupling said microphone means to said loud speaker means;
(d) said operating circuit means including means for substantially cancelling gradient noise caused signals transmitted to the loud speaker while leaving the voice signals substantially unaffected;
(e) said means for substantially cancelling gradient noise caused signals comprising recording means for recording said electrical intercom signals;
(f) difference means for subtracting the recorded intercom signals from newly generated intercom signals including patient voice caused signals and gradient noise caused signals;
(g) said recording means including first and second memory means;
(h) means for connecting said first memory means to selecting means for connecting either said first or said second memory means to said difference means for subtracting the recorded electrical intercom signals from the newly generated intercom signals;
(i) said selecting means also connecting the other of either said first or said second memory means to receive the newly generated electrical intercom signals;
(j) comparison means for determining the voice content of the recorded electrical intercom signals in the first memory means and in the second memory means for selecting between the first memory means and the second memory means to obtain the memory means with the lowest voice content for the next subtraction of the contents of the memory means from the newly generated electrical intercom signals; and
(k) means for connecting the output of the difference means to supply electrical signals to the loudspeaker.

4,696,031

SIGNAL DETECTION AND DISCRIMINATION USING WAVEFORM PEAK FACTOR

Richard L. Freudberg, Auburndale, Mass., and Marshall B. Garrison, Derry, N.H., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Dec. 31, 1985, Ser. No. 815,424
Int. Cl.[4] H04M *3/22*
U.S. Cl. 379—386 **41 Claims**



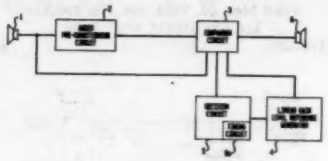
32. A method of determining the progress of a call comprising:
receiving waveforms from a telephone line;
making peak factor measurements of the received waveforms;
determining call status using the peak factor measurements.

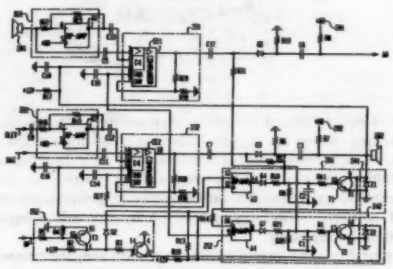
4,696,032

VOICE SWITCHED GAIN SYSTEM

Allan Levy, Delray Beach, Fla., assignor to Siemens Corporate Research & Support, Inc., Iselin, N.J.

Filed Feb. 26, 1985, Ser. No. 705,935
Int. Cl.[4] H04M *9/08*; H04R *3/06*
U.S. Cl. 379—390 **6 Claims**





2. A voice switched gain system for a loudspeaking telephone including an electret microphone, the system comprising first and second voice switch gain circuits for providing three states of operation of the loudspeaking telephone, the voice switched gain system being connected at a near end of a transmission channel having an audio source at a far end, a first, nonpre-emptive, idle state wherein neither an audio source at the loudspeaking telephone controls audio signal transmission nor does the audio source at the far end of the transmission channel to the loudspeaking telephone control audio signal transmission, a second, preemptive state where the audio source at the near end controls audio signal transmission, and a third, preemptive state where the audio source at the far end controls audio signal transmission,

the first and second voice switched gain circuits each comprising: a controlled compandor connected in series with the transmission channel, a decision circuit and a reference gain level generator, the decision circuit providing a two state control signal for controlling the activation of the compandor to perform an expansion of an input signal and provide an expanded signal at its output when an input signal level presented to the compandor exceeds a level provided by the reference gain level generator; the first voice switched gain circuit effectuating the second preemptive state and, the second voice switch gain circuit effectuating the third state, each controlled compandor being switched off and providing no gain in the transmission channel during the first, non-preemptive idle state.

6. A carbon transmitter emulation circuit for a telephone, the emulation circuit having an idle state, a square law state and a linear gain state of operation, the emulation circuit comprising an electret microphone circuit for providing an output, an audio preconditioning circuit for conditioning the output of the electret microphone circuit, a controlled compandor circuit, and a reference gain level generating circuit, the emulation circuit being in the linear gain state for expanding audio input signals presented to it when the level of the output of the electret microphone circuit exceeds a reference gain level output of the reference gain level generating circuit, the con-

trolled compandor circuit effectuating the audio input signal expansion in a linear manner.

4,696,033

ONE-PIECE TELEPHONE HOOK SWITCH OPERATING MECHANISM

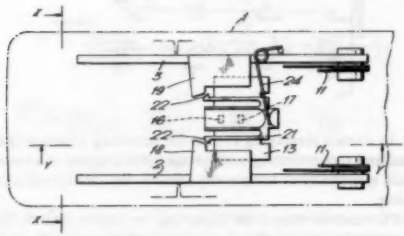
Ronald Else, Woodbridge, England, assignor to British Telecommunications public limited company, Great Britain

Filed Jan. 23, 1985, Ser. No. 694,038

Claims priority, application United Kingdom, Jan. 23, 1984, 8401721

Int. Cl.⁴ H04M *1/08*

U.S. Cl. 379—424 **7 Claims**



1. A one-piece telephone instrument provided with a hook switch operating mechanism, the mechanism comprising: a first and second members each having a respective actuating portion arranged, in use, for projection from an outer surface of said telephone instrument biased towards relatively extended positions, and arranged for mutually independent displacement with respect to said outer surface; and a switch actuating member for actuating the hook switch of said telephone instrument, wherein the mechanism further includes means linking the motion of the first and second members and of the switch actuating member such that, in use, when the first and second acutating portions are both at relatively retracted positions with respect to the said outer surface the switch actuating member is disposed such that the hook switch is in the on-hook state, and when one or both of the first and second actuating portions is or are at a relatively extended position or positions with respect to said outer surface the switch actuating member is disposed such that the hook switch is in the off-hook state.

4,696,034

HIGH SECURITY PAY TELEVISION SYSTEM

John D. Wiedemer, Houston, Tex., assignor to Signal Security Technologies, Houston, Tex.

Filed Oct. 12, 1984, Ser. No. 660,512

Int. Cl.⁴ H04N *7/167*; G06K *15/00*

U.S. Cl. 380—16 **23 Claims**

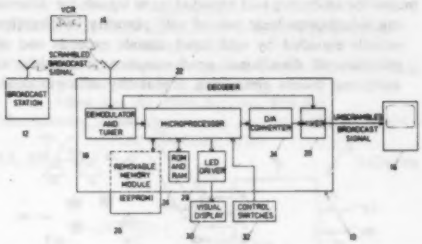
9. In a pay television system, a receiving station signal decoder for a scrambled broadcast signal comprising

an internal fixed memory containing a fixed, station-unique internal code;

a removable, electrically alterable, removable memory module containing at least one pre-written station-unique, external code which can be combined with the internal code to generate a systemwide system code, and also a portion onto which program information may be entered;

means for generating a descrambling signal complementary to the scrambling signal upon input of a proper numerical sequence; and

a microprocessor programmed (1) to read the internal code from the fixed memory and the external code from the portable memory module, (2) to combine the external code with the internal code to generate the systemwide system code, to generate and output to the descrambling signal generating means a numerical signal generated from the system code, (4) to derive a broadcast code from the scrambled broadcast signal, and (5) to write information



about programs actually descrambled, as determined from the broadcast code, in the memory module so that use of the decoder can be billed on a usage basis.

4,696,035

SYSTEM FOR EXPANDING THE STEREO BASE OF STEREOPHONIC ACOUSTIC DIFFUSION APPARATUS

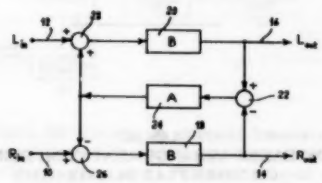
Guido Torelli, S. Alessio, and Alejandro De La Plaza, Bergamo, both of Italy, assignors to SGS Microelectronica S.p.A., Catania, Italy

Filed Jul. 28, 1986, Ser. No. 889,921

Claims priority, application Italy, Aug. 9, 1985, 21898 A/85

Int. Cl.⁴ H04R *5/00*

U.S. Cl. 381—1 **8 Claims**



1. A system for expanding the stereo base for stereophonic acoustic diffusion apparatus, in which a first and a second input signal, constituting a stereophonic pair, are amplified in respective direct amplifier means, in order to obtain a first and a second output signal, wherein, in order to expand the stereo base, said output signals are added by adder means in a predetermined phase relationship, chosen between phase coincidence and phase opposition, and the sum signal thus produced is processed by a feedback block having a predetermined transfer function, and is then superimposed on the first input signal with opposite phase, and is superimposed on said second input signal in phase opposition or phase coincidence, depending on whether said output signals are added respectively in phase coincidence or phase opposition.

4,696,036

DIRECTIONAL ENHANCEMENT CIRCUIT

Stephen D. Julstrom, Chicago, Ill., assignor to Shure Brothers, Inc., Evanston, Ill.

Filed Sep. 12, 1985, Ser. No. 775,437

Int. Cl.⁴ H04R *5/00*

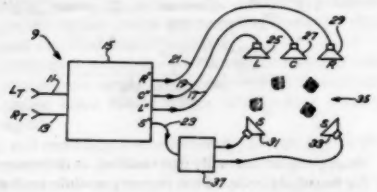
U.S. Cl. 381—22 **20 Claims**

1. A system for receiving N number of audio input signals encoded with sound information including a plurality of directional sounds, and for driving at least N+1 loudspeakers, the loudspeakers being physically arranged to generate apparent

sound images in relation to the encoded directional sounds, comprising:

input means for receiving said encoded input signals;

means for analyzing said encoded input signals for determining whether at least one of said plurality of directional sounds encoded by said input signals exceeds one of a plurality of directional predominance thresholds, said analyzing means generating a plurality of logic control



signals, each said logic control signal representing a directional sound and having a logic state representing directional predominance exceeding a corresponding one of said plurality of directional predominance thresholds;

speaker drive means for generating loudspeaker signals from said input signals, said speaker drive means being responsive to said logic signals for dynamically enhancing the directional stability of the apparent sound images generated by the loudspeakers.

4,696,037

LOUDSPEAKER ARRANGEMENT COMPRISING ONE OR MORE FLAT DIAPHRAGMS

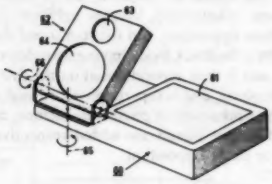
Gustaaf E. M. Fierens, Dendermonde, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 27, 1983, Ser. No. 565,309

Claims priority, application Netherlands, Jan. 4, 1983, 8300011

Int. Cl.[4] H04R 5/00

U.S. Cl. 381—24 **30 Claims**



1. A loudspeaker arrangement comprising: a first loudspeaker unit for reproducing a low-frequency audio signal, a second separate loudspeaker unit provided with a loudspeaker for reproducing a high-frequency audio signal, the two loudspeaker units being constructed to have no mechanical connection between them, and means electrically connecting the loudspeaker units to one another and which comprise interengageable parts that can be disengaged from one another to disconnect the units, characterized in that the first loudspeaker unit comprises at least two flat diaphragms.

4,696,038

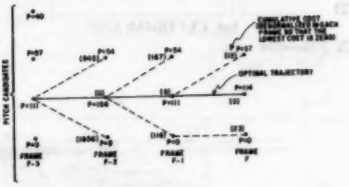
VOICE MESSAGING SYSTEM WITH UNIFIED PITCH AND VOICE TRACKING

George R. Doddington, and Bruce G. Secrest, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 13, 1983, Ser. No. 484,718

Int. Cl.[4] G10L 5/00

U.S. Cl. 381—38 **10 Claims**



1. In a voice messaging system for receiving a human speech signal and reconstituting said human speech signal at a receiver which is spatially or temporally remote, the combination comprising:

LPC analysis means for analyzing an analog speech signal provided as an input thereto in accordance with an LPC (Linear Predictive Coding) model, said LPC analysis means providing LPC parameters and a residual signal organized in a sequence of speech data frames and the respective residual signals corresponding thereto as an output representative of the analog speech signal;

pitch extraction means operably associated with said LPC analysis means for determining a plurality of pitch candidates for each of the speech data frames in said sequence;

optimization means operably associated with said LPC analysis means and said pitch extraction means for performing dynamic programming with respect both to said plurality of pitch candidates for each speech data frame and also to a voiced/unvoiced decision for each speech data frame to determine both an optimal pitch and an optimal voicing decision for each speech data frame in the context of sequence of speech data frames, said optimization means defining a transition error between each pitch candidate of the current frame and each pitch candidate of the preceding frame, and defining a cumulative error for each pitch candidate in the current frame which is equal to the transition error between said pitch candidate of said current frame plus the cumulative error of an optimally identified pitch cnadidate in the preceding frame, said optimally identified pitch candidate in the preceding frame being chosen from among the pitch candidates for said preceding frame such that the cumulative error of said corresponding pitch candidate in said current frame is at a minimum; and

means operably associated with said LPC analysis means, said pitch extraction means and said optimization means for encoding said LPC parameters and said optimal pitch and optimal voicing decision for each speech data frame.

4,696,039

SPEECH ANALYSIS/SYNTHESIS SYSTEM WITH SILENCE SUPPRESSION

George R. Doddington, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 13, 1983, Ser. No. 541,497

Int. Cl.[4] G10L 5/00

U.S. Cl. 381—46 **2 Claims**

1. A speech coding system, comprising:

an analyzer connected to recieve speech input data and to generate therefrom a sequence of frames of speech param-

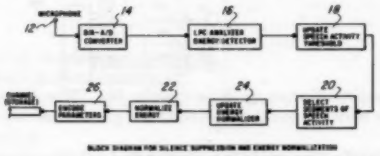
eters, said frames each having plural parameters including an energy value;

a buffer connected to said analyzer for storing up to a predetermined number of said frames;

a nonsilent energy tracker for adjusting a value representing an energy contour for nonsilent frames;

a silent energy tracker for adjusting a value representing an energy contour for silent frames; and

silence suppression means connected to said buffer, and to said silent and nonsilent energy trackers, for identifying each frame as silent or nonsilent, wherein said silence suppression means, once a nonsilent frame has been identified, identifies a silent frame only when a continuous succession of frames having an energy less than a predetermined function of the silent energy contour value is generated, and wherein said silence suppression means,



once a silent frame has been identified, identifies a nonsilent frame only when a voiced frame having an energy higher than a predetermined function of the nonsilent energy contour value is generated;

wherein, when a silent frame is identified following a nonsilent frame, all previous frames in said buffer which have an energy less than a predetermined function of the silent energy contour value are retroactively identified as silent;

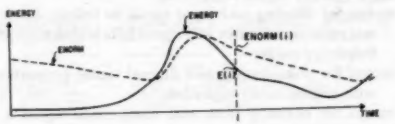
and wherein, when a nonsilent voiced frame is identified following a silent frame, all previous frames in said buffer which have an energy value greater than a predetermined function of the nonsilent energy contour value, and which are not separated from the nonsilent voiced frame by more than a selected number of frames having an energy level less than the predetermined function of the nonsilent energy contour value, are identified as nonsilent frames.

4,696,040

SPEECH ANALYSIS/SYNTHESIS SYSTEM WITH ENERGY NORMALIZATION AND SILENCE SUPPRESSION

George R. Doddington, and Panos E. Papamichalis, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 13, 1983, Ser. No. 541,410
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—46 **26 Claims**



1. A speech coding system, comprising:

an analyzer for receiving a digital speech signal and generating therefrom a sequence of frames, each frame having speech parameters, said parameters of each frame including an energy value;

means coupled to said analyzer for normalizing the energy value of each said speech frame with respect to energy values of subsequently generated frames of the sequence; and

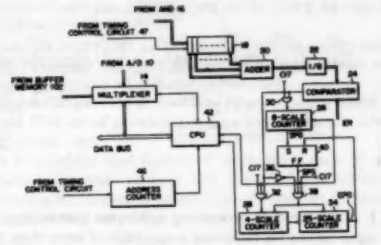
means coupled to said normalizing means for loading said parameters for each said speech frame of the sequence, including said normalized energy parameter of each said speech frame, into a data channel.

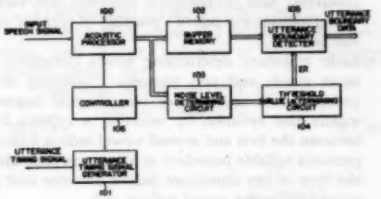
4,696,041

APPARATUS FOR DETECTING AN UTTERANCE BOUNDARY

Tomio Sakata, Tokyo, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 30, 1984, Ser. No. 575,383
Claims priority, application Japan, Jan. 31, 1983, 58-13997
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—46 **3 Claims**





1. An apparatus for detecting an utterance boundary by comparing a speech signal with a threshold value generated in accordance with an average value of the speech signals in a predetermined period of time which begins immediately after inputting of the speech signal comprising:

utterance timing signal generating means for generating an utterance timing signal when a speech signal including a silent period is input as uttered words;

speech parameter generating means for receiving the speech signal which is input according to the utterance timing signal from said utterance timing signal generating means and generating speech parameter time sequence data;

noise level determining means for generating noise level data which is the average value of speech parameter values of a background noise corresponding to the silent period in a predetermined period of time which begins immediately after inputting of the speech signal generated in synchronism with the utterance timing signal from said utterance timing signal generating means on the basis of the speech parameter time sequence data output from the speech parameter generating means;

threshold value determining means for calculating based on the noise level data output from the noise level determining means, an utterance boundary detetion threshold value including a predetermined bias value which is variable in response to change in the average value of the speech parameter values; and

utterance boundary detecting means for producing utterance boundary data including a start point and end point for determining an utterance boundary on the basis of the utterance boundary detection threshold value and speech

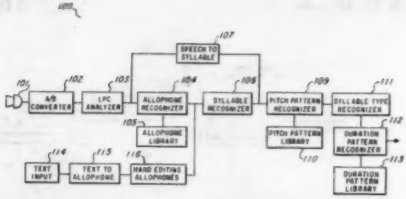
parameter time sequence data generated from the speech parameter generating means.

4,696,042

SYLLABLE BOUNDARY RECOGNITION FROM PHONOLOGICAL LINGUISTIC UNIT STRING DATA

Kathleen M. Goudie, Lubbock, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 3, 1983, Ser. No. 548,597
Int. Cl.[4] G10L *5/00*
U.S. Cl. 381—51 **13 Claims**



1. A speech data processing apparatus comprising:

input means for receiving a sequence of input data including a sequence of phonological linguistic unit indicia;

phonetic classifying means connected to said input means for classifying said phonological linguistic unit indicia as a vowel indicia or as one of a plurality of types of consonant indicia;

syllable boundary determining means connected to said input means and said phonetic classifying means for grouping said sequence of phonological linguistic unit indicia into syllables by inserting a syllable boundary between the first and second vowel indicia following the previous syllable boundary at a location depending upon the type of any consonant indicia between said first and second following vowel indicia; and

transmission means connected to said input means and said syllable boundary determining means for transmitting said sequence of phonological linguistic unit indicia and an indication of said syllable boundaries.

4,696,043

MICROPHONE APPARATUS HAVING A VARIABLE DIRECTIVITY PATTERN

Makoto Iwahara, Sagamihara; Naotaka Miyaji, Yamato, and Atsushi Sakamoto, Sagamihara, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Aug. 16, 1985, Ser. No. 766,280
Claims priority, application Japan, Aug. 24, 1984, 59-176288; Aug. 29, 1984, 59-130756[U]
Int. Cl.[4] H04R *1/40*
U.S. Cl. 381—92 **20 Claims**

1. A microphone apparatus comprising:

an array of equally spaced microphones, the microphones being divided into a center subarray and a pair of side subarrays located one on each side of the center subarray;

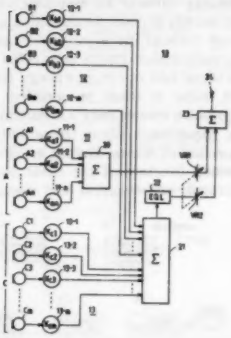
a first weighting network having a plurality of weighting factors for impressing a first weighting function on signals from the microphones of the center subarray.

second and third weighting networks each having a plurality of weighting factors for impressing second and third weighting functions respectively on signals from the microphones of said side subarrays, said first, second and third weighting functions corresponding respectively to center and side portions of a sensitivity profile which varies as a function of positions on said array;

a first adder for summing signals from said first weighting network;

a second adder for summing signals from said second and third weighting networks;

a third adder for summing signals from said first and second adders to produce an output signal; and



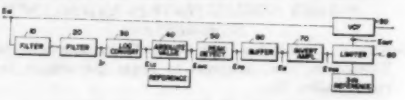
level setting means for adjusting the level of an output signal from said second adder in a predetermined relationship with the level of an output signal from said first adder to provide a variable directivity pattern.

4,696,044

DYNAMIC NOISE REDUCTION WITH LOGARITHMIC CONTROL

James K. Waller, Jr., 9901 Allen Rd., Clarkston, Mich. 48016

Filed Sep. 29, 1986, Ser. No. 912,525
Int. Cl.[4] H03G *7/00*
U.S. Cl. 381—106 **7 Claims**



1. A system for deriving a dc control signal from an input audio frequency signal comprising:

means for filtering said input signal to reduce the level of said input signal when said signal falls within a preselected frequency range;

means for compressing said filtered signal proportionately with respect to its logarithm;

means for deriving from said compressed signal a signal proportional to the absolute value of said compressed signal;

means for generating a reference signal of variably selectable level;

means for combining said reference signal of variably selectable level with said absolute value signal;

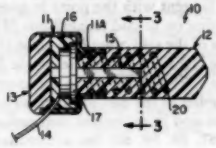
means for deriving a dc signal from said combined signal; and

means for passing said derived dc signal when its level exceeds a preselected signal level and for blocking said derived dc signal when its level falls below said preselected signal level.

4,696,045
EAR MICROPHONE

James M. Rosenthal, Cooper City, Fla., assignor to ACR Electronics, Hollywood, Fla.

Filed Jun. 4, 1985, Ser. No. 741,249
Int. Cl.[4] H04R 1/04, 1/10, 1/46, 17/02
U.S. Cl. 381—114 8 Claims

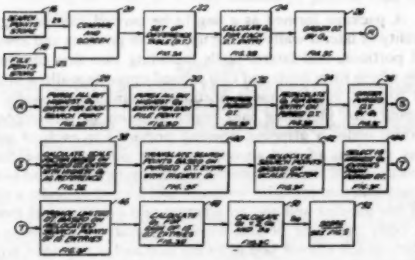


1. An ear microphone comprising:
an electroacoustic transducer;
a rigid housing, said transducer being partially disposed within said housing and partially extending out from said housing;
a helically wound compression spring partially disposed within and supported by said housing, and partially extending outward of said housing and surrounding said transducer;
semi-soft compound enclosing at least a portion of said transducer and said spring, said semi-soft compound having a shape adapted for insertion into a user's ear,
said compound being adapted to provide a better mechanical impedance match of said transducers to the human ear than to air to thereby reduce the effect of response of said transducer to airborne vibrations.

4,696,046
MATCHER

Michael Schiller, Riverdale, N.Y., assignor to Fingermatrix, Inc., North White Plains, N.Y.

Continuation-in-part of Ser. No. 762,118, Aug. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 718,870, Apr. 2, 1985, abandoned. This application Mar. 27, 1986, Ser. No. 845,154
Int. Cl.[4] G06H 9/00
U.S. Cl. 382—5 19 Claims

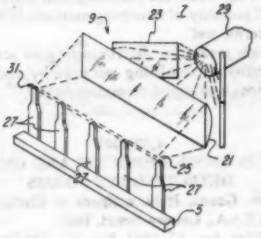


1. A matcher improvement for matching a set of Search identification points against a set of File identification points employing a difference table, comprising:
first memory means for storing a set of Search identification points as a set of binary value signals,
second memory means for storing a set of File identification points as a set of binary value signals,
multiple comparator means, each of said comparator means being coupled to a predetermined subset of said Search identification points and to a corresponding predetermined subset of said File identification points, each of said multiple comparative means having:
(i) differencing means to provide a first difference table and a first proximity value for each entry on said difference table,
(ii) constant adjustament means to provide a difference plane translation of that entry in said difference table which has the highest proximity value to the origin of the difference plane represented by said difference table, all of the entries in said difference table being translated by the same amount,
(iii) differential adjustment means to differentially adjust each entry in said difference table as a function of the distance between the Search point of the entry being adjusted and the Search point of the entry having the highest proximity value,
(iv) means to provide a final set of proximity values based on the difference table provided by said constant and said differential adjustment means, and
(v) means to provide at least one figure of merit based on said final set of proximity values for the Search subset involved, and
means to combine said figures of merit from each of said subsets to provide at least one overall figure of merit indicating the degree of match between said set of Search points and said set of File points.

4,696,047
APPARATUS FOR AUTOMATICALLY INSPECTING ELECTRICAL CONNECTING PINS

Donald J. Christian, Richardson, and Michael J. Stachowicz, Carrollton, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 28, 1985, Ser. No. 707,116
Int. Cl.[4] G06K 9/00
U.S. Cl. 382—8 6 Claims



1. A pin inspection system for inspecting a plurality of pins tips arranged in a predetermined configuration comprising:
illuminating means for illuminating the tips only, of pins which are of correct length, and which do not illuminate the tips of pins which are too long or too short;
video camera means for obtaining a video image of the illuminated pin tips by sweeping in a raster scan fashion the pin tips to obtain a first waveform representing light intensity versus relationship to the raster scan position;
a comparator for comparing the first waveform to a predetermined threshold and to provide a first logic state when the amplitude of the waveform is about the predetermined threshold and a second logic state when the amplitude of the first waveform is below the predetermined threshold;
memory means for arranging the first and second logic states according to the raster scan position;
summation means for locating clusters of the first logic states in both the row and column directions of the memory means;
isolation means for isolating clusters in the first logic state;
inertia measuring means for locating the first moment of

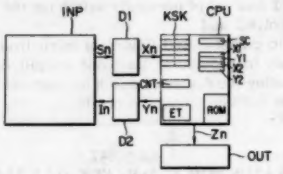
inertia for each of the isolated clusters of the first logic state to obtain a first coordinate for each cluster;
transformation means for transforming the first coordinates to physical distances;
comparator means for comparing the physical distance to a predetermined criterion; and
classifying according to the results of the comparison the transform coordinates to obtain the results of the pin tips inspection.

4,696,048

INPUT DEVICE

Ichiro Sado, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 505,859, Jun. 20, 1983, abandoned. This application Sep. 29, 1986, Ser. No. 912,652
Claims priority, application Japan, Jun. 28, 1982, 57-109955
Int. Cl.[4] G06K *9/00*
U.S. Cl. 382—13 **12 Claims**



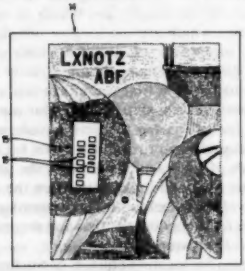
1. An input device comprising:
a plurality of selectively actuable switching matrices;
signal generating means for generating a plurality of signals;
signal scanning means for supplying said signals to each of said plurality of switching matrices in different scanning patterns;
signal receiving means for receiving said plurality of signals from said plurality of switching matrices in different scanning patterns; and
discrimination means for discriminating an actuated one of said plurality of switching matrices by said plurality of signals from said signal receiving means.

4,696,049

IMAGE SCANNING PROCESS AND UNIT FOR DETECTING SET FORMS

Giorgio Musso, Genoa, Italy, assignor to Elettronica San Giorgio-Elsag S.p.A., Genova-Sestri, Italy

Filed Apr. 17, 1985, Ser. No. 724,244
Claims priority, application Italy, Apr. 20, 1984, 67404 A/84
Int. Cl.[4] G06K *9/20*
U.S. Cl. 382—22 **15 Claims**



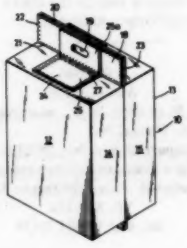
1. Image scanning process for detecting a set form (15) of an image characterised by the fact that it comprises a first stage for analysing signals (5) representing points on said image, for selecting first points (33, 34, 35, 36, 45, 46, 47, 48) defining areas in which the variation in contrast exceeds a given threshold, and for determining the direction (Ye) of a tangent line (37, 49) relative to each of said first points; a second stage for detecting whether, for each of said first points, there exist other first points (45, 46, 47, 48) lying on at least one line (40, 41, 42, 43) having a set length (L) and angle in relation to the direction (Ye) of the line (37) tangent with the point in question (33, 34, 35, 36) and in projecting on to said tangent line (37) projection points if the direction of the said other first point (45, 46, 47, 48) lying on the said line (L) has a second set angle in relation to the said tangent line (37); a third stage for memorising and accumulating the number of the said projections relative to the said projection points and in extracting said projection points (52, 53, 54, 55, 56, 57, 58, 59, 60) the accumulated value of which exceeds a given number threshold; and a fourth stage for selecting from among said extracted points (52, 53, 54, 55, 56, 57, 58, 59, 60) those points (52, 53, 54, 55) defining said set form (15) wherein said signals (5) representing points on the said image are supplied by scanning the surface of an item (2) and by means of optical-electronic conversion.

4,696,050

PACKAGE FORMED AS BAG TO BE CARRIED

Karl-Heinz Sengewald, Postfach 1460, 4802 Halle in Westf. 1, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,759
Claims priority, application Fed. Rep. of Germany, Oct. 20, 1984, 3438601
Int. Cl.[4] B65D *33/62, 33/08*
U.S. Cl. 383—10 **12 Claims**



1. A package formed as a bag to be carried, comprising a plurality of lateral walls having upper wall portions and lower wall portions, said lateral walls including two first opposite walls which form folds and two second opposite walls; a body part formed by said lower portions of said lateral walls; a gripping part including said upper portions of said second opposite walls, a gripping opening provided in each of said upper portions of said second opposite walls, and welding seams provided above and below said gripping opening so as to connect said first opposite walls and said second opposite walls with one another and also to separate said gripping part from said body part, one of said second opposite walls having a section which adjoins said gripping part and is provided with a window-like opening; and a covering foil which easily detachably covers said window-like opening.

4,696,051

SIMULCAST TRANSMISSION SYSTEM HAVING AUTOMTIC SYNCHRONIZATION

Robert L. Breeden, Boynton Beach, Fla., assignor to Motorola Inc., Schaumburg, Ill.

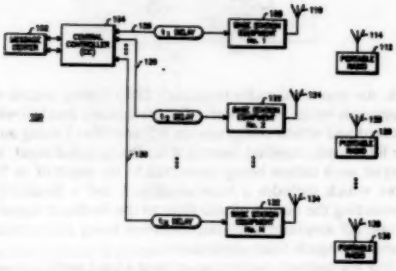
Filed Dec. 31, 1985, Ser. No. 815,334
Int. Cl.[4] H04B *7/00*
U.S. Cl. 455—33 **7 Claims**

1. A simulcast transmission system having automatic syn-

chronization for a plurality of transmitters which permit a message source to transmit message signals via a radio channel to a geographical area partitioned into zones, the system comprising:

a central controller, including a normal synchronized first mode and a second mode of operation, coupled to the message source for exchanging message signals therebetween;

a plurality of base station, each remotely sited to an assigned zone within a geographical area, each having at least one transmitter coupled to an antenna for transmitting message signals on the radio channel, each having an interconnect link exhibiting an associated value of fixed but unstable delay with respect to said central controller, and each including adaptive delay means coupled to said transmitter and said interconnect link; and



master timing signal receiving means included at e base station and at the central controller, for providing a reference sync signal therefrom,

said central controller periodically initiating said second mode by issuing a re-sync command coinciding with said sync signal, and

said adaptive delay means each having first and second modes of operation, with said second mode activated upon receiving said re-sync command for varying an adjustable time delay therein in opposite fashion to said fixed but unstable delay associated with said interconnect link for re-adjusting during said second mode and automatically maintaining during said first mode a constant total delay to each of said base stations, for sending message signals from said base stations in precise time synchronization.

4,696,052

SIMULCAST TRANSMITTER APPARATUS HAVING AUTOMATIC SYNCHRONIZATION CAPABILITY

Robert L. Breeden, Boynton Beach, Fla., assignor to Motorola Inc., Schaumburg, Ill.

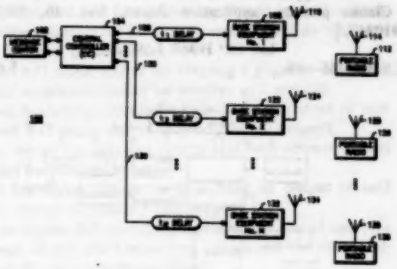
Filed Dec. 31, 1985, Ser. No. 815,432
Int. Cl.[4] H04B *1/00, 7/00*
U.S. Cl. 455—51 **11 Claims**

1. In a plurality of base stations, each having a transmitter connected to a central controller via an interconnect link having an associated time delay and forming one branch of a simulcast transmission system for transmitting message signals in a synchronized first mode, apparatus for providing automatic synchronization capability, the apparatus comprising in combination:

adaptive delay means, inserted between said interconnect link and said transmitter, having a first input electrically connected to said interconnect link and a second input for utilizing a reference sync signal; and

master timing signal receiving means electrically connected to said second input of said adaptive delay means for providing said reference sync signal thereto,

said adaptive delay means having a first and a second mode of operation, with said second mode activated upon detecting a re-sync command from said central controller at said first input and utilizing said reference sync signal at said second input for varying an adjustable time delay therein in opposite fashion to said associated delay, for



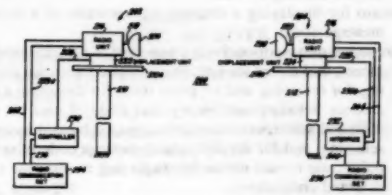
re-adjusting, during said second mode and automatically maintaining during said first mode, a constant total delay from said central controller to each of said transmitters, for sending message signals from said base stations in precise time synchronization.

4,696,053

ANTENNA ALIGNMENT SYSTEM AND METHOD

Dennis Mastriani, Lakewood; Donald Jacoby, Elberon; Jeanne Weise, Ocean; Bruce Linick, Wayside; John Marinho, Elizabeth, and Charles M. DeSantis, Neptune, all of N.J., assignors to Canadian Marconi Corporation, Montreal, Canada

Filed Jul. 3, 1985, Ser. No. 751,386
Int. Cl.[4] H04B *7/14*
U.S. Cl. 455—67 **21 Claims**



1. In a method for effecting communication between first and second antennas, the steps of:

(a) mutually displacing said first and second antennas, determining received signal strength at each antenna from transmissions by the other thereof and positioning said antennas accordingly to obtain a first quality level of communication therebetween; and

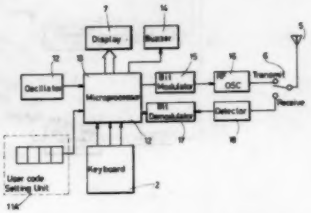
(b) effecting a second quality level of communication as between said first and second antennas, said second quality level exceeding said first quality level, by defining a plurality of succeedingly diminishing search movement patterns for each of said first and second antennas, transmitting individually from said first and second antennas while displacing the receiving antenna thereof in such patterns and detecting the level of receipt of such transmitted energy by the receiving antenna thereof,

wherein said step (a) is practiced by equipping said first and second antennas with concurrently operative transmit and receive capability and simultaneously transmitting from and receiving at each said antenna while displacing same at respectively different rates.

4,696,054
POCKETABLE WIRELESS TRANSMITTER AND RECEIVER

Shinji Tsugei, and Tomohiro Inoue, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 561,291, Dec. 14, 1983, abandoned.
This application Jun. 23, 1986, Ser. No. 876,670
Claims priority, application Japan, Dec. 16, 1982, 57-191094[U]
Int. Cl.[4] H04B *1/38, 1/06*
U.S. Cl. 455—89 **5 Claims**



1. A wireless communicating device for wirelessly communicating message codes representative of specific messages with one of a plurality of additional communicating devices, comprising:

an antenna;

demodulator means, connected to said antenna, for detecting and demodulating a transmission received by said antenna on a predetermined frequency band, said demodulator means converting said transmission into a bit pulse train;

said bit pulse train comprising a start bit, a binary user code specifying a particular said communicating device selected to recognize said transmission, a binary message code, and a stop bit;

means for selecting a desired user code for said wireless communicating device;

means for displaying a decimal representatio of a detected message code;

processor means, operatively connected to said demodulator means, said means for selecting and said means for displaying, for receiving said bit pulse train, for detecting a coincidence between said binary user code of said bit pulse train and said desired user code selected by said means for selecting, and for supplying said message code of said bit pulse train to said means for displaying in response to the detected coincidence;

keyboard means for introducing a desired message code to be transmitted;

said processor means being responsive to said keyboard and developing a said bit pulse train for transmission to a selected additional communicating device, said bit pulse train including a binary user code of the selected additional communicating device to receive said bit pulse train;

bit modulator means responsive to said processor means for modulating said bit pulse train into a tone burst waveform; and

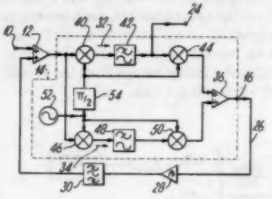
oscillator means, operatively connected to said bit modulator means, for converting said tone burst waveform into a transmission, said oscillator means supplying said transmission to said antenna;

said processor means repeatedly supplying said bit pulse train to said bit modulator means and oscillator means to repetitively transmit said transmission when said device is in a transmitting mode, said processor means supplying said message code to said means for displaying only after detecting said bit pulse train received by said device a predetermined repeated number of times when in a receiving mode.

4,696,055
RF TUNING CIRCUIT WHICH PROVIDES IMAGE FREQUENCY REJECTION

Christopher B. Marshall, Horley, United Kingdom, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 17, 1985, Ser. No. 809,694
Claims priority, application United Kingdom, Dec. 19, 1984, 8432010
Int. Cl.[4] H04B *1/04, 1/26, 1/10*
U.S. Cl. 455—118 **8 Claims**



1. An improved radio frequency (RF) tuning circuit which suppresses image frequencies of the frequency band to which it is tuned and which comprises: an RF amplifier having an input for RF signals supplied thereto, a feedback signal input, and an output; such output being connected to the input of an N-path filter which includes a local oscillator; and a feedback path connecting the output of said filter to the feedback signal input of said RF amplifier; such improvement being characterized in that said N-path filter comprises:

first and second quadrature related signal paths connecting the output of said RF amplifier to first and second inputs, respectively, of a summing amplifier, said summing amplifier having an output at which it produces output RF signals corresponding to the supplied RF signals, the output of said summing amplifier being connected to said feedback path to supply such output RF signals thereto as feedback signals;

said first signal path including in series a first mixer, a first filter and a second mixer, the output of said second mixer being coupled to the first input of said summing amplifier;

said second signal path including in series a third mixer, a second filter and a fourth mixer, the output of said fourth mixer being coupled to the second input of said summing amplifier;

and phase shift means coupling the output of said local oscillator in quadrature to said first and third mixers, respectively, and in quadrature to said second and fourth mixers, respectively;

such feedback path causing the center frequency of the transfer characteristic of said filter to be displaced from the frequency of said local oscillator therein by an amount determined by the relative gains of said feedback path and said RF amplifier;

whereby substantially only a single sideband of the signals produced at the outputs of said third and fourth mixers is included in the output RF signals produced by said summing amplifier.

4,696,056
FREQUENCY CONVERTING CIRCUIT

Hiroyuki Morita, Kumagaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 2, 1985, Ser. No. 751,235
Claims priority, application Japan, Jul. 5, 1984, 59-137986
Int. Cl.[4] H04B *1/26*
U.S. Cl. 455—182 **19 Claims**

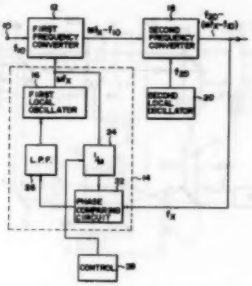
1. A frequency converting circuit for converting an input frequency into a stable output frequency, said frequency converting circuit comprising:

a first frequency converter for converting said input frequency into a first intermediate frequency;

first oscillator means for supplying a first oscillating frequency to said first frequency converter, said first oscillator means including a voltage controlled oscillator providing said first oscillating frequency;

a second frequency converter for converting said first intermediate frequency into a second intermediate frequency comprising; and

control means coupled between said first oscillator means and said second frequency converter, for controlling said first oscillating frequency of said first oscillator means according to said second intermediate frequency supplied



from said second frequency converter, said control means including a phase locked loop circuit coupled to said voltage controlled oscillator, said phase locked loop circuit further including programmable divider for dividing said first oscillating frequency of said voltage controlled oscillator by factor M, and a phase comparing circuit for comparing the phase of an output signal of said programmable divider with the phase of an output signal of said second frequency converter, the result of the comparison controlling said first oscillating frequency of said voltage controlled oscillator.

4,696,057

CN RATIO MEASUREMENT CIRCUIT

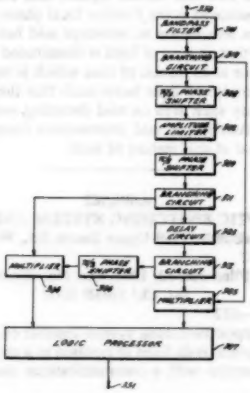
Susumu Otani, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 15, 1985, Ser. No. 787,422

Claims priority, application Japan, Oct. 16, 1984, 59-217047

Int. Cl.[4] H04B *17/00*

U.S. Cl. 455—226 **1 Claim**



1. A circuit for measuring carrier power to noise power ratio in a communication transmission channel including a nonlinear signal processing element, comprising:

a bandpass filter for band-limiting an input signal;

a first branching circuit for branching an output of said bandpass filter to produce two outputs;

a first $\pi/2$ phase shifter for rotating a phase of one of said two outputs of said first branching circuit by $\pi/2$ radians;

an amplitude-limiter for limiting an amplitude of an output of said first $\pi/2$ phase shifter;

a second $\pi/2$ phase shifter for rotating a phase of an output of said amplitude-limiter by another $\pi/2$ radians;

a second branching circuit for branching an output of said second $\pi/2$ phase shifter to produce two outputs;

a delay circuit for delaying one of said two outputs of said second branching circuit;

a third branching circuit for branching an output of said delay circuit to produce two outputs;

a first multiplier for producing a product of one of said two outputs of said third branching circuit and the other output of the first branching circuit;

a third $\pi/2$ phase shifter for rotating a phase of the other output of the third branching circuit by $\pi/2$ radians;

a second multiplier for producing a product of an output of said third $\pi/2$ phase shifter and the other output of the second branching circuit;

a first averaging circuit for averaging an output of the first multiplier;

a first squaring circuit for producing a square of an output of said first averaging circuit;

a second squaring circuit for producing a square of an output of the second multiplier;

a second averaging circuit for averaging an output of said second squaring circuit;

a divider for dividing an output of the first squaring circuit by an output of said second averaging circuit; and

a constant circuit for multiplying an output of said divider by a predetermined constant.

4,696,058

DIVERSITY RECEIVER

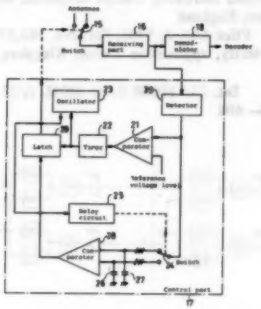
Ryobun Tachita, Kawasaki, and Akio Teranishi, Ebina, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 4, 1984, Ser. No. 678,161

Claims priority, application Japan, Dec. 6, 1983, 58-230110; Dec. 6, 1983, 58-230111; Jul. 13, 1984, 59-146446

Int. Cl.[4] H04B *1/06*

U.S. Cl. 455—277 **10 Claims**



1. A diversity receiver comprising:

at least first and second antennas;

a receiving part for receiving a signal from said antennas;

connecting means for selectively connecting one of said antennas to said receiving part;

detecting means for detecting an output signal from said receiving part;

means for generating a timing signal when said output signal detected by said detecting means has a higher level than a predetermined level;

means for generating a first control signal to supply to said connecting means for selectively connecting respective antennas during a predetermined period defined by said timing signal;

means for selecting one antenna which is receiving the most intensive signal by comparing levels of outputs of said detecting means each delivered from said first and second antennas during a period wherein said first control signal is supplied to said connecting means; and

means for generating a second control signal to connect said receiving part to said one antenna selected by said selecting means during a period wherein said timing signal exists.

4,696,059

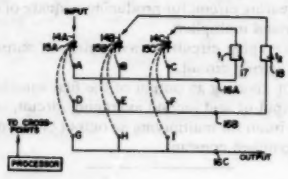
REFLEX OPTOELECTRONIC SWITCHING MATRIX

R. I. MacDonald; D. K. W. Lam, both of Ottawa, and R. W. Jenkins, Almonte, all of Canada, assignors to Canadian Patents and Development Limited-Societe Canadienne des Brevets et D'Exploitation Limitee, Ottawa, Canada

Filed Mar. 7, 1984, Ser. No. 586,777

Int. Cl.[4] H04B 9/00

U.S. Cl. 455—600 **63 Claims**



31. A signal processor comprising an optoelectronic switching matrix having switching crosspoints, a plurality of input ports, a plurality of output ports, and means for switching different signal delay means between all but one of the input ports and all but one of the output ports via the switching matrix.

4,696,060

OPTICAL TRANSMISSION SYSTEMS

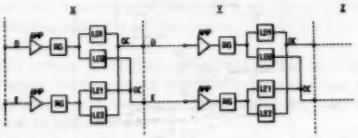
Thomas Oswald, Dartford, United Kingdom, assignor to STC plc, London, England

Filed Oct. 3, 1985, Ser. No. 783,570

Claims priority, application United Kingdom, Oct. 5, 1984, 8425232

Int. Cl.[4] H04B 9/00; H04L 1/22

U.S. Cl. 455—601 **6 Claims**



1. An optical repeater comprising at least two separate input and two separate optical fibre paths and two optical output sources coupled with each input path, wherein the sources coupled with each input path are permanently optically coupled with different respective output paths, and a supervisory system operatively connected to said sources is provided for selecting operation of a particular optical source by switching the source whereby transmission from an input path can be transferred to a different output path.

4,696,061

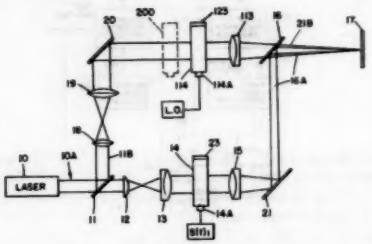
ACOUSTO-OPTIC R-F RECEIVER WHICH IS TUNABLE AND HAS ADJUSTABLE BANDWIDTH

Joseph H. Labrum, West Jordan, Utah, assignor to Sperry Corporation, Blue Bell, Pa.

Continuation of Ser. No. 566,437, Dec. 28, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 910,793

Int. Cl.[4] H04B 9/00; G02F 1/11

U.S. Cl. 455—609 **11 Claims**



1. An acousto-optic filter comprising,

light source means for providing a main coherent light beam,

beam splitter means for receiving and splitting said main light beam into first and second coherent light beams,

local oscillator means for supplying a fixed frequency first signal,

signal source means for supplying a second signal,

first and second acousto-optic cells driven by said first and second signals, respectively, each disposed to respectively receive one of said first and second coherent light beams at an acousto-optical angle, for diffracting and modulating said first and second light coherent beams in response to said first and second signals, respectively, in order to form first and second diffracted and modulated light beams,

optical superimposing and Fourier transform lens means for providing and projecting a heterodyned light beam derived from said first and second diffracted and modulated light beams,

and detection means having a detecting surface wherein said detection means is constructed for detecting said Fourier transformed heterodyned beam of light and for providing an electrical signal of an intermediate frequency derived from said first and second signals, said detecting surface being positioned at the Fourier focal plane of said Fourier transform lens means to intercept said heterodyned light beam so that an area of light is illuminated on said detecting surface at an instant of time which is representative of said heterodyned light beam such that the size and location of any such area on said detecting surface is respectively a function of said intermediate frequency and said first signal at said instant of time.

4,696,062

FIBER OPTIC SWITCHING SYSTEM AND METHOD

Edward V. LaBudde, 1768 Upper Ranch Rd., Westlake Village, Calif. 91362

Filed Jul. 12, 1985, Ser. No. 754,643

Int. Cl.[4] H04B 9/00

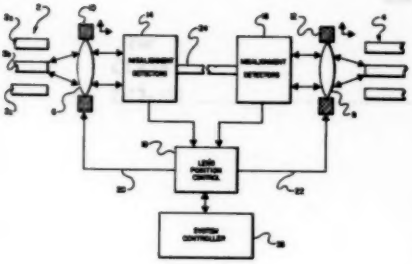
U.S. Cl. 455—612 **30 Claims**

1. A fiber optic switching system capable of rapidly switching among optical rods fixed in position in a multirod cable for optical connection with a communications channel, comprising:

a lens adapted to focus optical radiation emitted from a rod fixed in position to a beam suitable for transmission by the

communications channel, means for adjusting the lens position relative to the fixed rod,

position control means adapted to control the position adjusting means to sequentially position the lens at the approximate locations of desired fixed rods in the cable, and



means responsive to radiation transmitted from a desired fixed rod through the lens for detecting misalignments between the lens and said fixed rod,

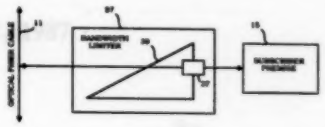
the position control means controlling the position adjusting means in response to detected misalignments to adjust the lens position so as to oppose detected misalignments between the lens and fixed rod.

4,696,063

OPTICAL FIBER BANDWIDTH LIMITING METHOD

John J. Schembri, Daly City, Calif., assignor to Pacific Bell, San Francisco, Calif.

Filed Aug. 30, 1985, Ser. No. 771,266
Int. Cl.[4] H04B 9/00
U.S. Cl. 455—612 2 Claims



1. In a fiber optic communication system wherein a plurality of subscribers are connected to a central office by optical fiber connections over each of which information is transmitted pursuant to a subscription agreement designating a predetermined subscription bandwidth for each said optical fiber connection, each of said optical fiber connections providing an information path extending from said central office to a respective subscriber premise, the improvement comprising means for regulating subscriber usage of each of said optical fiber connections comprising a plurality of bandwidth limiting devices, each connected in series in a respective one of said optical fiber connections in said information path, each said bandwidth limiting device including means for introducing material dispersion to the associated one of said optical fiber connections beyond that inherently present in said connection, said material dispersion being selected to limit the bandwidth of the associated one of said optical fiber connections to the said subscription bandwidth designated in the said subscription agreement associated with said optical fiber connection by limiting the frequency which can be transmitted on the associated optical fiber connection to a maximum frequency which is greater than or equal to the subscription bandwidth for said subscriber optical fiber connection but below that of the total capacity of said subscriber optical fiber connection.

DESIGN PATENTS

GRANTED SEP. 22, 1987

ERRATA

For CLASS	See PATENT NO.
D12-181	291,978

DESIGN PATENTS

GRANTED SEP. 22, 1987

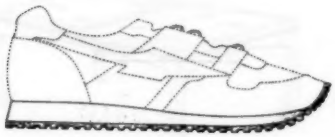
ERRATA

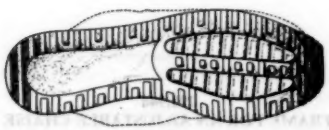
For	See
CLASS	PATENT NO.
D12-181	291,078

SEPTEMBER 22, 1987

291,940
FOOD PRODUCT
Geoffrey N. Jureidini, Summer Hill, Australia, assignor to Allied Mills Industries Pty. Limited, New South Wales, Australia
Filed Jan. 4, 1985, Ser. No. 688,994
Claims priority, application Australia, Jul. 19, 1984, 8237/84
Term of patent 14 years
U.S. Cl. D1—120

291,941
SHOE SOLE
Robert L. Peterson, Taichung, Taiwan, assignor to Pensa, Inc., Portland, Oreg.
Filed Jul. 9, 1986, Ser. No. 883,530
Term of patent 14 years
U.S. Cl. D2—320





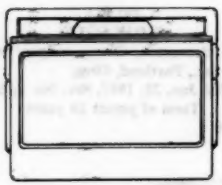
291,942
FLASHING LIGHT SAFETY BELT
Vernon D. Green, 104 East, 5350 South, Ogden, Utah 84403
Filed Jul. 13, 1984, Ser. No. 630,745
Term of patent 14 years
U.S. Cl. D2—628

291,943
SHOE SOLE
James K. Tong, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Jan. 29, 1987, Ser. No. 8,394
Term of patent 14 years
U.S. Cl. D2—320

291,944
SHOE SOLE
James K. Tong, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Jan. 29, 1987, Ser. No. 8,395
Term of patent 14 years
U.S. Cl. D2—320

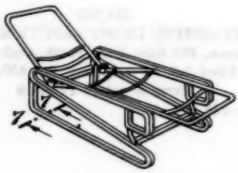
291,945
SHOE SOLE
Brenda Kelley, Beaverton, and Jack Curley, Portland, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.
Filed Jan. 29, 1987, Ser. No. 8,415
Term of patent 14 years
U.S. Cl. D2—320

291,946
TOOL CASE
Arduino Dottori, and Roberto Ingegnere, both of Milan, Italy, assignors to FACOM "Societe Anonyme", Morangis, France
Filed Jan. 30, 1985, Ser. No. 696,356
Claims priority, application France, Aug. 1, 1984, 843 457
Term of patent 14 years
U.S. Cl. D3—73

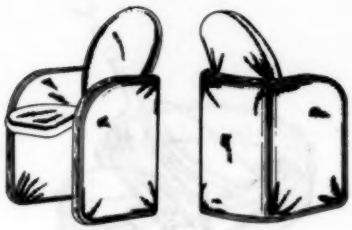


291,947
CASE FOR WRITING INSTRUMENTS
Toshiaki Nakata, Tokyo, Japan, assignor to Plus Corporation, Tokyo, Japan
Filed Mar. 19, 1986, Ser. No. 845,359
Claims priority, application Japan, Nov. 22, 1985, 60-49040
Term of patent 14 years
U.S. Cl. D3—74

291,948
FRAME FOR AN ADJUSTABLE CHAISE
Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.
Filed Mar. 26, 1985, Ser. No. 716,187
Term of patent 14 years
U.S. Cl. D6—361



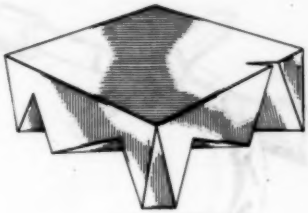
291,949
CHAIR
William B. Hendrick, Grand Rapids, Mich., assignor to Mueller Furniture Corporation, Grand Rapids, Mich.
Filed Apr. 5, 1985, Ser. No. 720,360
Term of patent 14 years
U.S. Cl. D6—375



291,950
TABLE
H. Thomas Keller, High Point, N.C., assignor to Bernhardt Industries, Lenoir, N.C.
Filed Apr. 15, 1985, Ser. No. 723,515
Term of patent 14 years
U.S. Cl. D6—430

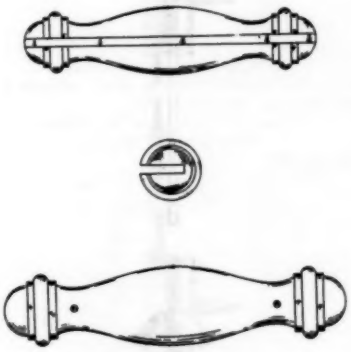
291,951
TABLE
Edward F. Lorio, 832 Arlington, Deland, Fla. 32724
Filed May 6, 1985, Ser. No. 730,477
Term of patent 14 years
U.S. Cl. D6—482

291,952
TABLE
Edward F. Lorio, 1207 Nathan Hunt Rd., Greensboro, N.C. 27410
Filed May 13, 1985, Ser. No. 733,115
Term of patent 14 years
U.S. Cl. D6—482



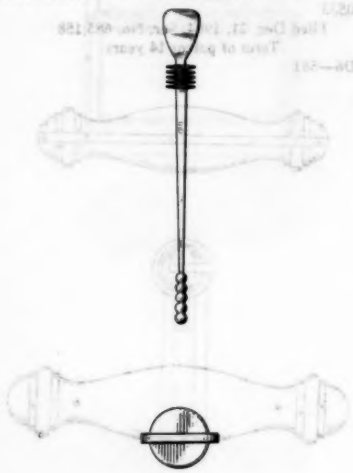
291,953
TABLE
H. Thomas Keller, High Point, N.C., assignor to Bernhardt Industries, Lenoir, N.C.
Filed Apr. 15, 1985, Ser. No. 723,512
Term of patent 14 years
U.S. Cl. D6—488

291,954
WINDOW SHADE PULL
Robert H. Litowitz, Old Pump House, Harriman Rd., Irvington, N.Y. 10533
Filed Dec. 21, 1984, Ser. No. 685,158
Term of patent 14 years
U.S. Cl. D6—581

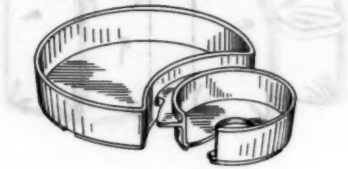


291,955
SILK SCREEN STENCIL DECORATION FOR A PLATE OR SIMILAR ARTICLE
Jean-Jacques Durand, LaBute 62510, Arques, France
Filed Jun. 5, 1985, Ser. No. 741,471
Term of patent 14 years
U.S. Cl. D7—39

291,956
SWIZZLE STICK
Paul A. Fenner, P.O. Box 39, Guildford, Surrey GU1 4QU, England
Filed Nov. 16, 1984, Ser. No. 672,066
Claims priority, application United Kingdom, May 21, 1984, 1019798
Term of patent 14 years
U.S. Cl. D7—42

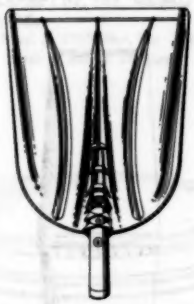


291,957
COMBINED CANAPE TRAY AND GLASS HOLDER
Kenneth V. Stevens, Brooklyn, N.Y., assignor to Grainware Company, Chicago, Ill.
Filed Feb. 7, 1985, Ser. No. 699,077
Term of patent 14 years
U.S. Cl. D7—70

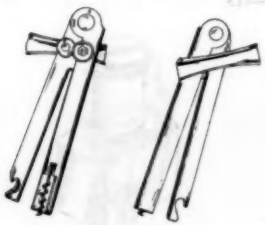


291,958
ROASTING RACK
William M. Tullberg, 44, Church Street, Calne, Wiltshire, SN11 0HZ, United Kingdom
Filed Oct. 1, 1984, Ser. No. 656,413
Claims priority, application United Kingdom, Mar. 31, 1984, 1018864
Term of patent 14 years
U.S. Cl. D7—409

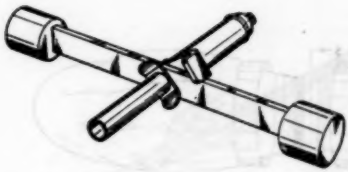
291,959
GRAIN SCOOP
Harold O. Eads, Parkersburg, and Rudolph F. Planthaber, Mineral Wells, both of W. Va., assignors to O. Ames Co., Parkersburg, W. Va.
Filed Apr. 23, 1985, Ser. No. 726,381
Term of patent 14 years
U.S. Cl. D8—10



291,960
CAN OPENER
Peter Kerti, 45 Bromley Crescent, Toronto, Ontario (M9A 3X1)
Filed Mar. 12, 1984, Ser. No. 588,315
Claims priority, application Canada, Sep. 14, 1983, 1409831
Term of patent 14 years
U.S. Cl. D8—18



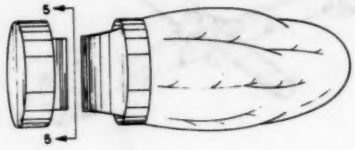
291,961
IMPACT WRENCH
Sten-Ake Andersson, Box 8, S-360 24 Linneryd, Sweden
Filed May 9, 1984, Ser. No. 609,671
Claims priority, application Sweden, Nov. 9, 1983, 832927
Term of patent 14 years
U.S. Cl. D8—24



291,962
HACKSAW FOR HAND USE
William G. Johnson, Mequon, and James L. Clark, Thiensville, both of Wis., assignors to Johnson Level & Tool Mfg. Co., Milwaukee, Wis.
Filed Sep. 28, 1984, Ser. No. 655,578
Term of patent 14 years
U.S. Cl. D8—95

291,963
CLAMP
William Farmer, 334 Orenda Cir., Westfield, N.J. 07090
Filed Oct. 15, 1984, Ser. No. 661,239
Term of patent 14 years
U.S. Cl. D8—394

291,964
DISPENSING CONTAINER
Lawrence S. Albright, Plant City, Fla., assignor to Jerry Burnett Jones and Virginia Leola Jones, both of Lakeland, Fla.
Filed Aug. 20, 1984, Ser. No. 642,550
Term of patent 14 years
U.S. Cl. D9—302

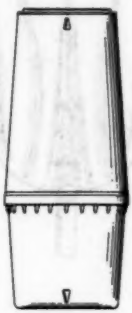


291,965
BOTTLE
Philip C. Best, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Apr. 29, 1985, Ser. No. 728,059
Term of patent 14 years
U.S. Cl. D9—376

291,966
PACKAGING CONTAINER
Donald N. MacLaughlin, Midland, Mich., assignor to Cosden Technology, Inc., Big Spring, Tex.
Filed Jul. 22, 1985, Ser. No. 757,400
Term of patent 14 years
U.S. Cl. D9—389

291,967
PACKAGING CONTAINER
Donald N. MacLaughlin, and Mark W. Sumeren, both of Midland, Mich., assignors to Cosden Technology, Inc., Big Spring, Tex.
Filed Dec. 5, 1985, Ser. No. 805,018
Term of patent 14 years
U.S. Cl. D9—390

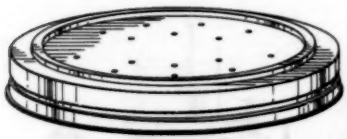
291,968
PACKAGING CONTAINER
Donald N. MacLaughlin, Midland, Mich., assignor to Cosden Technology, Inc., Big Spring, Tex.
Filed Dec. 5, 1985, Ser. No. 805,015
Term of patent 14 years
U.S. Cl. D9—398



291,969
PLASTIC SUPPLY BOTTLE
Gregory D. Kramer, North St. Paul, and Daniel L. Vanlanen, Stacy, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Apr. 29, 1985, Ser. No. 728,658
Term of patent 14 years
U.S. Cl. D9—413

291,970
LID FOR A CONTAINER
Gene L. Downing, 15630 Cecil Ave., Riverside, Calif. 92504, and Ronald A. Fields, 15432 Golden Star, Riverside, Calif. 92506
Filed Dec. 6, 1984, Ser. No. 678,656
Term of patent 14 years
U.S. Cl. D9—436

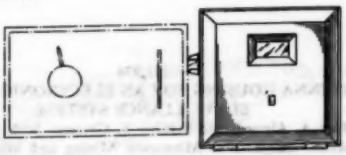
291,971
CONTAINER LID
Ernest L. Smith, Kansas City, Mo., assignor to Sealright Co., Inc., Kansas City, Mo.
Filed Mar. 5, 1985, Ser. No. 708,428
Term of patent 14 years
U.S. Cl. D9—447

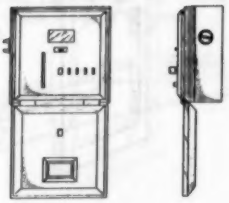


291,972
DISPENSING PUMP CLOSURE
Peter Pfeiffer, Gaienhofen, Fed. Rep. of Germany, assignor to Pfeiffer Kunststofftechnik GmbH, Fed. Rep. of Germany
Filed Oct. 9, 1984, Ser. No. 658,645
Term of patent 14 years
U.S. Cl. D9—448

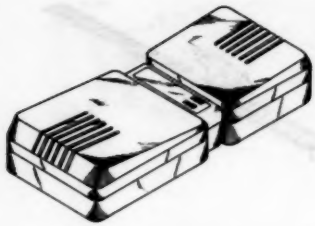
291,973
TOY ROBOT-AIRCRAFT WATCH
Takayoshi Doi, Ichikawa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Jan. 30, 1985, Ser. No. 696,641
Claims priority, application Japan, Dec. 27, 1984, 59-53237
Term of patent 14 years
U.S. Cl. D10—33

291,974
AUTOMATIC THERMOSTAT CONTROL
Kenneth R. Fenne, Glen Ellyn, Ill., assignor to Pittway Corporation, Aurora, Ill.
Division of Ser. No. 622,871, Jun. 20, 1984, Pat. No. Des. 288,068. This application Dec. 31, 1986, Ser. No. 948,295
Term of patent 14 years
U.S. Cl. D10—50





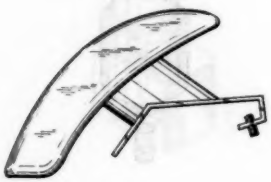
291,975
ALARM
Yau Ching-Hua, P.O. Box 2064, Taichung, Taiwan
Filed Jan. 11, 1985, Ser. No. 690,742
Term of patent 14 years
U.S. Cl. D10—106



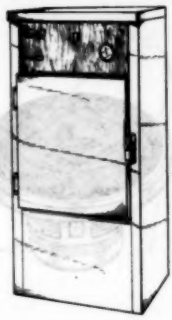
291,976
ANTENNA HOUSING FOR AN ELECTRONIC ARTICLE SURVEILLANCE SYSTEM
Jeffrey A. Alward, and Stanley T. Gresens, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Dec. 24, 1984, Ser. No. 685,408
Term of patent 14 years
U.S. Cl. D10—121

291,977
JEWELRY FINDING
Linda B. Sebring, 302 Deerfield Dr., New Carlisle, Ohio 45344
Filed May 7, 1985, Ser. No. 731,364
Term of patent 14 years
U.S. Cl. D11—54

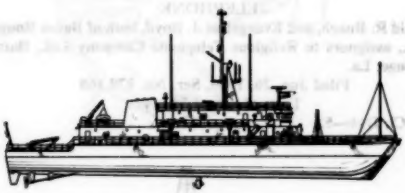
291,978
SPOILER VANE FOR SMALL VANS
Alan Parr, Utica, and Lee K. Graves, Bloomfield, both of Mich., assignors to Wickes Manufacturing Company, Southfield, Mich.
Filed Jul. 11, 1985, Ser. No. 753,752
Term of patent 14 years
U.S. Cl. D12—181



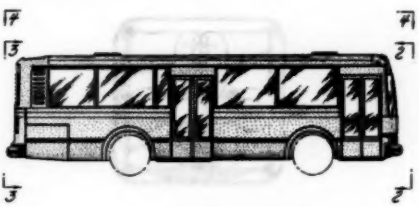
291,979
SEED GERMINATOR OR SIMILAR ARTICLE
Richard O. Klemm, 559 Cress Creek, Crystal Lake, Ill. 60014
Filed Apr. 2, 1985, Ser. No. 719,169
Term of patent 14 years
U.S. Cl. D11—145



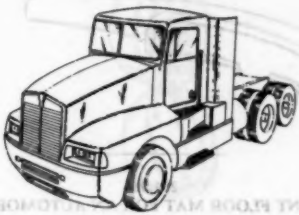
291,980
SURFACE EFFECT SHIP
John B. Chaplin, Covington, La., assignor to Textron Inc., Providence, R.I.
Filed Jul. 18, 1985, Ser. No. 756,456
Term of patent 14 years
U.S. Cl. D12—5



291,981
BUS BODY
Donald L. Manning, 4002 Normanwood Dr., Orchard Lake, Mich. 48033
Filed May 3, 1985, Ser. No. 729,923
Term of patent 14 years
U.S. Cl. D12—84



291,982
TRUCK CAB
Wayne K. Simons; Roy L. Meryman, and Larry W. Orr, all of King County, Wash., assignors to Paccar Inc, Bellevue, Wash.
Filed Feb. 6, 1985, Ser. No. 698,771
Term of patent 14 years
U.S. Cl. D12—96

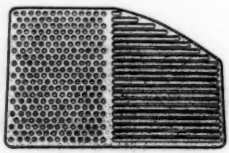


291,983
DASHBOARD PANEL
Paul D. Cornwell, Littleton, Colo., assignor to Import Auto Products, Ltd., Denver, Colo.
Filed Jul. 11, 1985, Ser. No. 754,350
Term of patent 14 years
U.S. Cl. D12—192

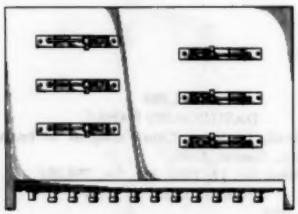
291,984
DASHBOARD PANEL
Paul D. Cornwell, Littleton, Colo., assignor to Import Auto Products, Ltd., Denver, Colo.
Filed Jul. 12, 1985, Ser. No. 754,351
Term of patent 14 years
U.S. Cl. D12—192

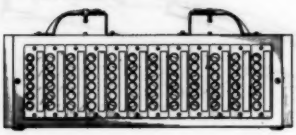
291,985
DASHBOARD PANEL
Paul D. Cornwell, Littleton, Colo., assignor to Import Auto Products, Ltd., Denver, Colo.
Filed Jul. 12, 1985, Ser. No. 754,352
Term of patent 14 years
U.S. Cl. D12—192

291,986
FRONT FLOOR MAT FOR AN AUTOMOBILE
Aina K. Nilsson, Trollhättan, Sweden, assignor to Saab-Scania Aktiebolag, Trollhättan, Sweden
Filed Jul. 16, 1985, Ser. No. 755,713
Claims priority, application Sweden, Jan. 16, 1985, 85-0091
Term of patent 14 years
U.S. Cl. D12—203



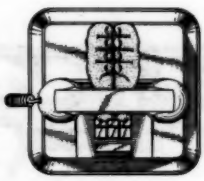
291,987
MOBILE LIGHTGUIDE CABLE ACCESS UNIT FOR TESTING, REARRANGING AND POWERING OPTICAL FIBERS
Robert A. Jordan, Waukegan; Michael P. Hogan, Chicago, and Henry J. Mackey, Countryside, all of Ill., assignors to Illinois Bell Telephone Company, Chicago, Ill.
Filed Sep. 21, 1984, Ser. No. 652,902
Term of patent 14 years
U.S. Cl. D13—41



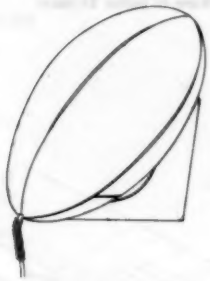


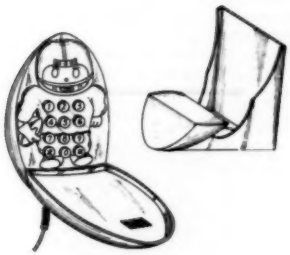
291,988
SPEAKER
Hideaki Ishizaki, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan
Filed May 15, 1985, Ser. No. 734,223
Claims priority, application Japan, Dec. 21, 1984, 59-52604
Term of patent 14 years
U.S. Cl. D14—30

291,989
TELEPHONE
Donald R. Roach, and Evangeline J. Boyd, both of Baton Rouge, La., assignors to Religious Telephone Company Ltd., Baton Rouge, La.
Filed Jun. 26, 1986, Ser. No. 879,168
Term of patent 14 years
U.S. Cl. D14—53

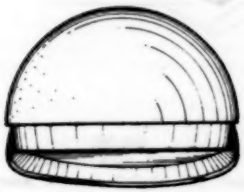


291,990
HANDSET TELEPHONE AND STAND SET
Peter Lee, 2nd Fl., 7 Lane 93, Pao Ping Rd., YungHo City, Taiwan
Filed Feb. 8, 1985, Ser. No. 699,477
Term of patent 14 years
U.S. Cl. D14—53

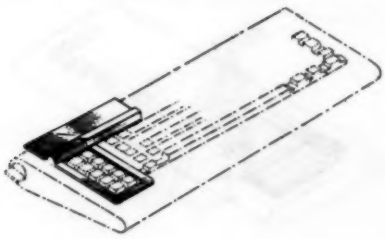




291,991
HANDSET TELEPHONE
Peter Lee, 4th Fl., 7, Alley 25, Lane 300, Jen Ai Rd., Sec. 4, Taipei, Taiwan
Filed Dec. 19, 1985, Ser. No. 810,681
Term of patent 14 years
U.S. Cl. D14—64



291,992
PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.
Filed May 31, 1985, Ser. No. 739,634
The portion of the term of this patent subsequent to Sep. 22, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—114



291,993

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

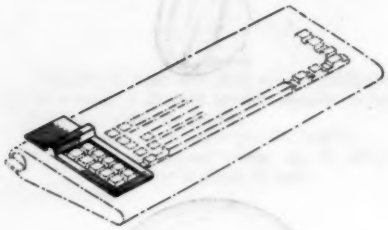
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,635

The portion of the term of this patent subsequent to Sep. 22, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,994

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

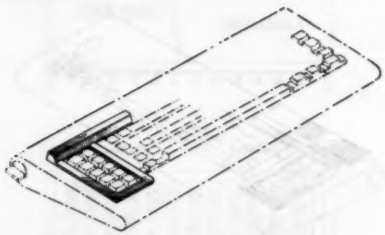
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,636

The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,995

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

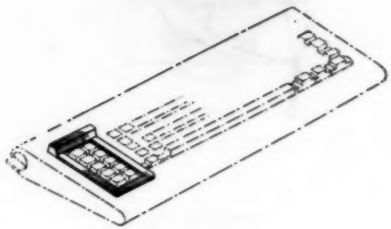
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,637

The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,996

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

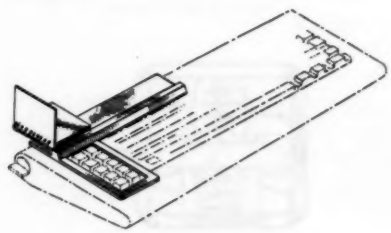
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,638

The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,997

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

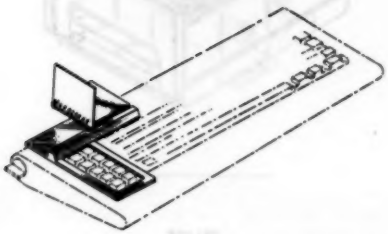
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,639

The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,998

PERSONAL COMPUTER KEYBOARD TEMPLATE FOR DISPLAYING OPERATING INSTRUCTIONS FOR SOFTWARE PROGRAM

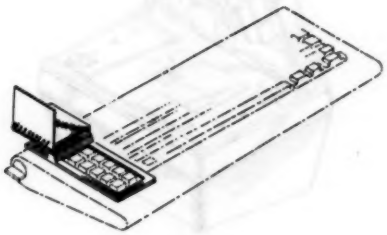
Thorvald E. Duffin, II, Reston, Va., assignor to TDA, Inc., Redmond, Wash.

Filed May 31, 1985, Ser. No. 739,640

The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



291,999

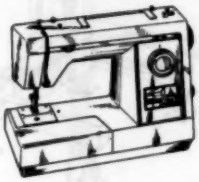
SEWING MACHINE

Yoshihide Yoneda, Osaka, Japan, assignor to Maruzen Sewing Machine Co., Ltd., Osaka, Japan

Filed May 31, 1984, Ser. No. 615,740

Term of patent 14 years

U.S. Cl. D15—69



292,000

INDUSTRIAL ROBOT

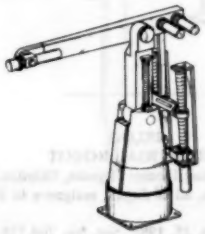
Masato Shibayama, Sayama; Takeshi Abe, Tokyo; Ko Tsuji, Hunabashi; Akira Uchida, and Masayuki Ohshiro, both of Narashino, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 14, 1985, Ser. No. 701,522

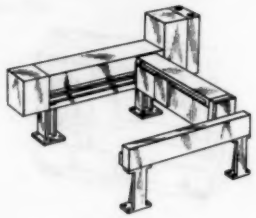
Claims priority, application Japan, Aug. 17, 1984, 59-34381; Aug. 17, 1984, 59-34382

Term of patent 14 years

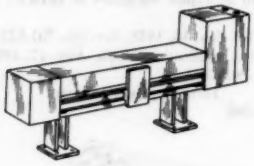
U.S. Cl. D15—199



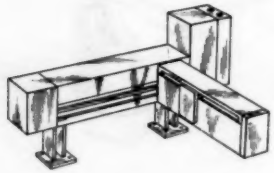
292,001
INDUSTRIAL ROBOT
Yutaka Imaizumi, Yaizu; Housei Higashi, Shimizu, and Masato Shibayama, Sayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,719
Claims priority, application Japan, Sep. 19, 1984, 59-38545
Term of patent 14 years
U.S. Cl. D15—199



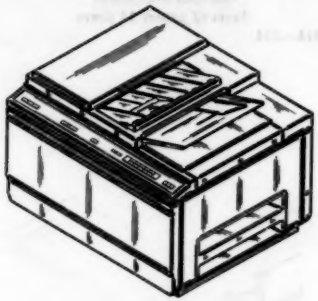
292,002
INDUSTRIAL ROBOT
Masato Shibayama, Sayama; Yutaka Imaizumi, Yaizu, and Housei Higashi, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,722
Claims priority, application Japan, Sep. 19, 1984, 59-38543
Term of patent 14 years
U.S. Cl. D15—199



292,003
INDUSTRIAL ROBOT
Yutaka Imaizumi, Yaizu; Housei Higashi, Shimizu, and Masato Shibayama, Sayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,725
Claims priority, application Japan, Sep. 19, 1984, 59-3854
Term of patent 14 years
U.S. Cl. D15—199



292,004
ELECTRONIC COPYING MACHINE
Harumi Fukuda, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Jan. 28, 1985, Ser. No. 696,600
Term of patent 14 years
U.S. Cl. D16—31

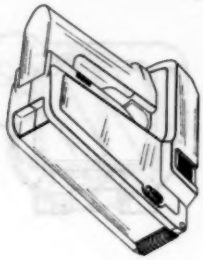


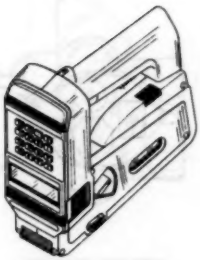
292,005
ELECTRICALLY POWERED IMPRINTER
Harvey K. McQuarrie, Kitchener, Canada, assignor to National Business Systems, Ontario, Canada
Filed Sep. 27, 1985, Ser. No. 780,988
Term of patent 14 years
U.S. Cl. D18—14

292,006
LABELER

Mitsuo Fujita, Washimiyamachi, Japan, assignor to Kabushiki Kaisha Shinsei Industries, Tokyo, Japan

Filed Nov. 19, 1985, Ser. No. 805,924
Claims priority, application Japan, Jun. 11, 1985, 60-24429
Term of patent 14 years
U.S. Cl. D18—19



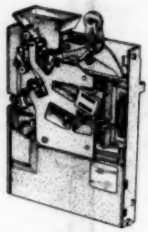


292,007
FLEXIBLE PEN

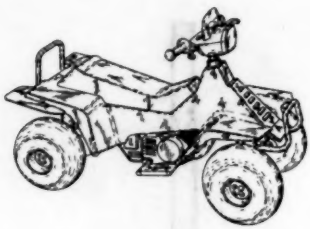
Emilio Ambasz, 295 Central Park West, New York, N.Y. 10024

Filed Feb. 25, 1985, Ser. No. 704,788
Term of patent 14 years
U.S. Cl. D19—48

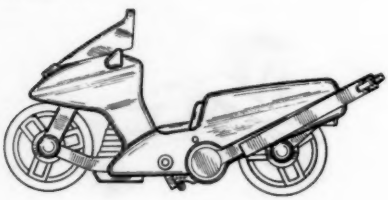
292,008
COIN SELECTOR FOR AUTOMATIC VENDOR
Osamu Kobayashi; Masanori Tanaka; Masaki Akagawa, all of Sakado, and Ryoji Yamagishi, Kawagoe, all of Japan, assignors to Kabushiki Kaisha Nippon Coinco, Tokyo, Japan
Filed Dec. 11, 1984, Ser. No. 680,546
Claims priority, application Japan, Jun. 29, 1984, 59-26564
Term of patent 14 years
U.S. Cl. D20—9



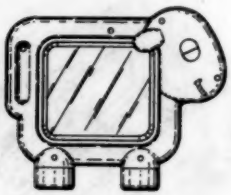
292,009
RIDING TOY
Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco Manufacturing, Inc., San Francisco, Calif.
Filed May 29, 1985, Ser. No. 738,880
Term of patent 14 years
U.S. Cl. D21—76



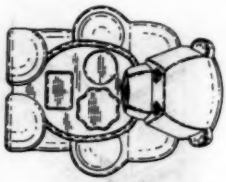
292,010
TOY VEHICLE
Robert K. Allen; Howard N. Bollinger; David A. Myers, all of Cincinnati, Ohio; Eric J. Simpson, Newport, and W. Grey Williams, Covington, both of Ky., assignors to Kenner Parker Toy Inc., Beverly, Mass.
Filed Feb. 14, 1985, Ser. No. 701,590
Term of patent 14 years
U.S. Cl. D21—78



292,011
CHILD'S FIGURE TOY
Harry S. Thomson, Richmond; David M. Raffo, and John A. Pape, both of Hitchin, all of England, assignors to Hestair Kiddicraft Ltd., Great Britain
Filed Feb. 19, 1985, Ser. No. 702,484
Claims priority, application United Kingdom, Jan. 14, 1985, 1024389
Term of patent 14 years
U.S. Cl. D21—148



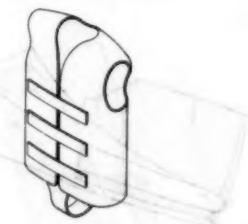
292,012
TOY FIGURE
Harry S. Thomson, Richmond; David M. Raffo, and John A. Pape, both of Hitchin, all of England, assignors to Hestair Kiddicraft Ltd., Great Britain
Filed Feb. 19, 1985, Ser. No. 702,669
Claims priority, application United Kingdom, Jan. 14, 1985, 1024391
Term of patent 14 years
U.S. Cl. D21—159



292,013
CLOWN DOLL
Bret Chia, 7807 Telegraph Rd. #G, Montebello, Calif. 90640
Filed Nov. 28, 1986, Ser. No. 936,135
Term of patent 14 years
U.S. Cl. D21—173

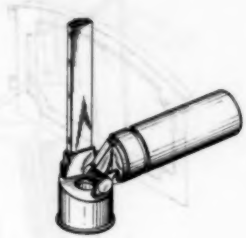
292,014
FOOTBAG
Robert J. Stalberger, Jr., Vancouver, and LeRoy F. Kennedy, Camas, both of Wash., assignors to Kransco Manufacturing, Inc., San Francisco, Calif.
Filed Dec. 5, 1983, Ser. No. 557,966
The portion of the term of this patent subsequent to Nov. 26, 1999, has been disclaimed.
Term of patent 14 years
U.S. Cl. D21—205

292,015
HYDROTHERAPY VEST
James G. McWaters, 5074 Shelby Dr., Birmingham, Ala. 35243
Continuation of Ser. No. 674,503, Nov. 7, 1984, abandoned. This application Nov. 10, 1986, Ser. No. 906,839
Term of patent 14 years
U.S. Cl. D21—238

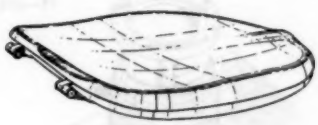


292,016
HORSE-SHAPED SWING
Lewis D. Osterman, 1245 Norwood #42, Boulder, Colo. 80302
Filed Dec. 26, 1984, Ser. No. 686,446
Term of patent 14 years
U.S. Cl. D21—246

292,017
DEMINERALIZING FILTER FOR ULTRASONIC HUMIDIFIERS
Nobuo Tsuchida, Sanjo, Japan, assignor to Uchida Manufacturing Co., Ltd., Niigata, Japan
Filed Jul. 24, 1985, Ser. No. 758,249
Claims priority, application Japan, Mar. 16, 1985, 60-010455
Term of patent 14 years
U.S. Cl. D23—4

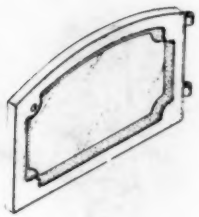


292,018
COMBINED TOILET SEAT AND COVER, OR SIMILAR ARTICLE
Louis L. Lepoix, Baden-Baden, France, assignor to Dansk Pressalit A/S, Arhus C, Denmark
Filed Aug. 1, 1985, Ser. No. 761,371
Claims priority, application Denmark, Feb. 22, 1985, 142-85
Term of patent 14 years
U.S. Cl. D23—71

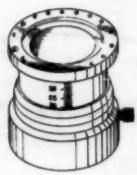


292,019
TOILET SEAT COVER
Brenda A. Hall, 4100 Abbott St., Fort Wayne, Ind. 46806
Filed Feb. 5, 1985, Ser. No. 698,360
Term of patent 14 years
U.S. Cl. D23—11

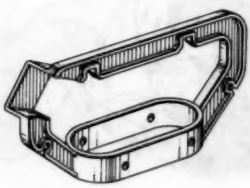
292,020
STOVE DOOR
Kurt W. F. Rumens, and Robert E. Holley, both of 10850 117th Pl. NE., Kirkland, Wash. 98033
Filed Nov. 30, 1984, Ser. No. 676,669
Term of patent 14 years
U.S. Cl. D23—128



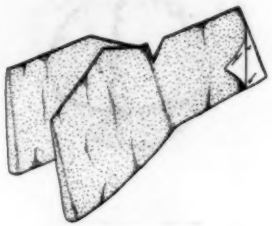
292,021
COMBINED ENDODONTIC GAUGE AND INSTRUMENT HOLDER
Walter Stoll, 2943 Emmick Dr., Toledo, Ohio 43606
Filed Nov. 19, 1985, Ser. No. 805,928
Term of patent 14 years
U.S. Cl. D24—16

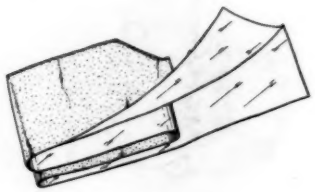


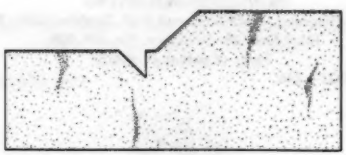
292,022
HANDLE FOR A DIAGNOSTIC URINEMETER UNIT
James K. Bullock, Burbank; William G. Bloom, Northridge; Bernard Siegel, Los Angeles, and Richard Lobodzinski, Sunland, all of Calif., assignors to American Hospital Supply Corp., Evanston, Ill.
Filed Mar. 14, 1985, Ser. No. 712,573
Term of patent 14 years
U.S. Cl. D24—17



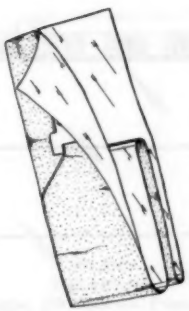
292,023
SURGICAL SHEET
Carl-Otto Hanssen, Kullavik, and Bo M. Starzmann, Göteborg, both of Sweden, assignors to Molnlycke Aktiebolag, Göteborg, Sweden
Filed Oct. 11, 1984, Ser. No. 659,882
Claims priority, application Sweden, May 29, 1984, 841660
Term of patent 14 years
U.S. Cl. D24—49

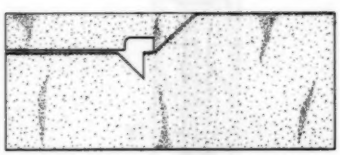




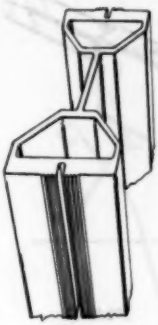


292,024
SURGICAL SHEET
Carl-Otto Hanssen, Kullavik, and Bo M. Starzmann, Göteborg, both of Sweden, assignors to Molnlycke Aktiebolag, Göteborg, Sweden
Filed Oct. 9, 1984, Ser. No. 658,824
Claims priority, application Sweden, May 29, 1984, 841661
Term of patent 14 years
U.S. Cl. D24—49



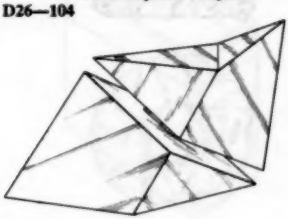


292,025
STRUCTURAL BEAM
Lars-Birger Lundström, Skellefteå, Sweden, assignor to H. B. Megaron, Skellefteå, Sweden
Filed Aug. 21, 1984, Ser. No. 642,941
Term of patent 14 years
U.S. Cl. D25—77

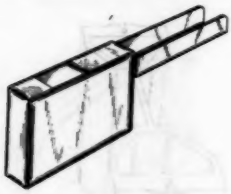


292,026
LIGHTING FIXTURE
Leonardus A. C. Krol, Gorkum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Sep. 16, 1985, Ser. No. 776,326
Claims priority, application Netherlands, Mar. 29, 1985, DM/005.015
Term of patent 14 years
U.S. Cl. D26—77

292,027
LAMP
Eric LaRoye, Koningstraat 14 -Bus 2, B-8400 Oostende, Belgium
Filed Dec. 27, 1984, Ser. No. 686,946
Claims priority, application Belgium, Jul. 4, 1984, 1236902
Term of patent 14 years
U.S. Cl. D26—104



292,028
POCKET ASHTRAY
Andrew Rhodes, 51 Watson Ave., Ossining, N.Y. 10562
Filed Aug. 12, 1985, Ser. No. 764,571
Term of patent 14 years
U.S. Cl. D27—8

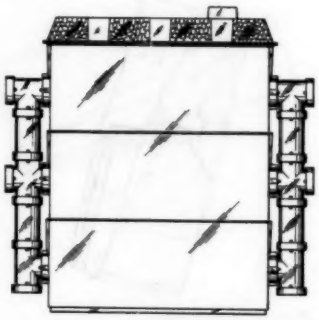


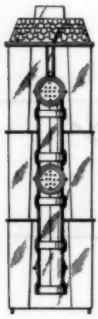
292,029
LIGHTER
Sadao Yoshinaga, Ichikawa, Japan, assignor to Yoshinaga Prince Company Limited, Tokyo, Japan
Filed Jul. 18, 1985, Ser. No. 756,763
Claims priority, application Japan, Apr. 6, 1984, 59-13536; Nov. 7, 1984, 59-45878
Term of patent 14 years
U.S. Cl. D27—36

292,030
ORNAMENTAL HAIRBAND OR SIMILAR ARTICLE
Rommy Revson, 225 E. 57th St., New York, N.Y. 10022
Filed Dec. 11, 1986, Ser. No. 940,636
Term of patent 14 years
U.S. Cl. D28—41

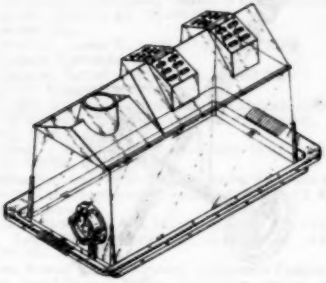
292,031
TWEEZER
Herman G. Kirkpatrick, 9801 Cedar, Overland Park, Kans. 66207
Filed Jun. 6, 1985, Ser. No. 741,839
Term of patent 14 years
U.S. Cl. D28—55

292,032
RODENT HABITAT
Jerry Margolis, Br., Newark County, N.J., assignor to Metaframe Inc., Irvington, N.J.
Filed Oct. 25, 1985, Ser. No. 791,575
Term of patent 14 years
U.S. Cl. D30—1

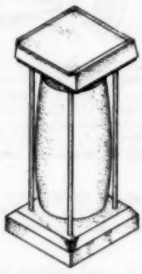




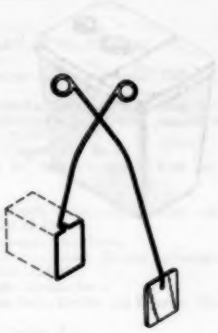
292,033
RODENT HABITAT
Jerry Margolis, Br., Newark County, N.J., assignor to Metaframe Inc., Irvington, N.J.
Filed Oct. 25, 1985, Ser. No. 791,576
Term of patent 14 years
U.S. Cl. D30—1



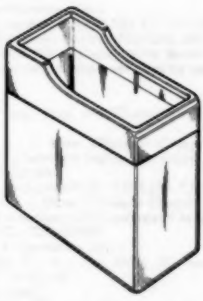
292,034
AQUARIUM
William H. Perkinson, 730 Woodrow, Festus, Mo. 63028
Filed Oct. 25, 1985, Ser. No. 791,467
Term of patent 14 years
U.S. Cl. D30—8



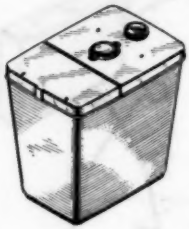
292,035
PET LITTER RETRIEVER
Frank J. Aksamit, 12605 Blackberry Row, Bayonet Point, Fla. 33567
Filed Oct. 23, 1985, Ser. No. 790,383
Term of patent 14 years
U.S. Cl. D30—99



292,036
TRASH BAG HOLDER
Howard Sussman, 3101 NW. 25th Ave., Pompano Beach, Fla. 33069
Filed Aug. 2, 1985, Ser. No. 761,797
Term of patent 14 years
U.S. Cl. D34—6

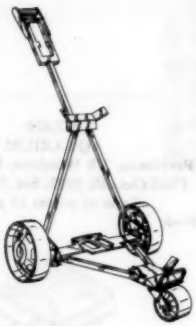


292,037
WASTE RECEPTACLE
Paul H. Hanifl, Barrington, Ill., assignor to Sage Products, Inc., Cary, Ill.
Filed Oct. 4, 1985, Ser. No. 784,515
Term of patent 14 years
U.S. Cl. D34—7



292,038
FOLDING GOLF CART
Ming-Chih Hsieh, 6F-3, 67, Sung-Chiang Rd., Taipei, Taiwan
Filed Apr. 29, 1985, Ser. No. 728,697
Term of patent 14 years
U.S. Cl. D34—15

292,039
FOLDING GOLF CART
Harold J. Moore, Fountain Ct., 48 Benwick Rd., Doddington, Cambridgeshire, United Kingdom PE15 OGT
Filed Oct. 2, 1985, Ser. No. 782,802
Claims priority, application United Kingdom, Apr. 2, 1985, 1025937
Term of patent 14 years
U.S. Cl. D34—15



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF SEPTEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Duda & Sons, Inc.: *See*—
Boots, Gordon C., 4,694,717, Cl. 83-222.000.

Aalto, Erkki; and Yla-Hemmila, Veikko, to Halton Oy. Flow regulator and its use. 4,694,851, Cl. 137-499.000.

AB Dentatus: *See*—
Edwardson, Svante R., 4,695,252, Cl. 433-73.000.

AB Hedemora Verkstader: *See*—
Ragnegard, Samuel, 4,695,381, Cl. 210-403.000.

Abduganiev, Abdurakhim: *See*—
Zhigalov, Gennady V.; Abduganiev, Abdurakhim; Kim, Sergei Y.; and Mosheev, Robert R., 4,694,642, Cl. 57-5.000.

Abdulally, Iqbal F.: *See*—
Gorzegno, Walter P.; and Abdulally, Iqbal F., 4,694,758, Cl. 110-347.000.

Abe, Akira; Nakajima, Junya; and Nishikawa, Toshihiro, to Fuji Photo Film Co., Ltd. Image-forming process. 4,695,529, Cl. 430-351.000.

Abe, Mitsuo: *See*—
Iriyama, Shozo; and Abe, Mitsuo, 4,694,508, Cl. 2-21.000.

Ables, Lee. Seat/backpack/sled combination. 4,694,979, Cl. 224-151.000.

Abraham, Ronald F., to Honeywell Information Systems Inc. Printed circuit board bolt-on power distribution system. 4,695,923, Cl. 361-361.000.

Abramowski, Larry A.: *See*—
Koper, Kenneth T.; Willard, Sylvester L.; and Abramowski, Larry A., 4,695,520, Cl. 429-116.000.

Acco Babcock Inc.: *See*—
Lichtenberg, Norman B.; and Chaczyk, Adam W., 4,694,706, Cl. 74-501.50R.

ACI Australia Limited: *See*—
Granat, Rodney J., 4,694,969, Cl. 215-252.000.

Ackelson, Donald B.; Moorehead, Eric L.; Ward, John W.; and Probst, Jon D., to Union Oil Company of California. Hydrocarbon refining process. 4,695,365, Cl. 208-89.000.

Ackeret, Peter. Container for flat recording media. 4,694,957, Cl. 206-309.000.

Ackman, Terry E.; and Place, John M., to United States of America, Interior. Acid mine water aeration and treatment system. 4,695,378, Cl. 210-198.100.

Acla, Howard L. R.: *See*—
Ritsko, Joseph E.; Houck, David L.; and Acla, Howard L. R., 4,695,439, Cl. 423-263.000.

Acme Resin Corporation: *See*—
Armbruster, David R., 4,694,905, Cl. 166-280.000.

ACR Electronics: *See*—
Rosenthal, James M., 4,696,045, Cl. 381-114.000.

Adam, Jean-Marie: *See*—
Lacroix, Roger; Adam, Jean-Marie; and Vincze, Janos, 4,695,406, Cl. 260-372.000.

Adama, Kenneth D., to SSMC Inc. Sewing machine bed slide retention. 4,694,763, Cl. 112-184.000.

Adams, Robert W. Condensing sub-cooler for refrigeration systems. 4,694,662, Cl. 62-509.000.

Aderski, Pentcho K.: *See*—
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.

Advance Transformer Company: *See*—
Hallay, Alexander R., 4,695,771, Cl. 315-290.000.

Advanced Extraction Technologies, Inc.: *See*—
Bunting, Terry N., 4,695,672, Cl. 585-867.000.

Advanced Magnetics Inc.: *See*—
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,392, Cl. 252-62.540.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,393, Cl. 252-62.540.

Advanced Separation Technologies Incorporated: *See*—
Berry, W. Wes, 4,695,386, Cl. 210-665.000.
Berry, W. Wes; and Erickson, William R., 4,695,387, Cl. 210-676.000.

AEPLC: *See*—
Baigent Maurice G., 4,695,169, Cl. 384-36.000.

af Ekenstam, Bo T.; and Bovin, Christer, to Astra Lake Medel Aktiebolag. L-N-n-propylpipecolic acid-2,6-xylidide. 4,695,576, Cl. 514-330.000.

Agarwal, Satish: *See*—
Guha, Subhendu; and Agarwal, Satish, 4,695,859, Cl. 357-19.000.

Agback, Karl H.; Agback, Tamara; and Nygren, Alf S., to Pharmacia AB. Novel arylacetic acid derivatives. 4,695,648, Cl. 560-053.000.

Agback, Tamara: *See*—
Agback, Karl H.; Agback, Tamara; and Nygren, Alf S., 4,695,648, Cl. 560-053.000.

AGFA-Gevaert N.V.: *See*—
Servais, Raoul, 4,695,141, Cl. 352-50.000.

Aghili, Hafez K.: *See*—
Montgomery, George J., IV; and Aghili, Hafez K., 4,695,303, Cl. 62-24.000.

Aiba, Shuichi; and Imanaka, Tadayuki, to Shionogi & Co., Ltd. Transforming *Bacillus stearothermophilus* with plasmid vector pTB 19. 4,695,546, Cl. 435-172.300.

Aickin Development Corporation: *See*—
Lindberg, Verne L.; and Stockinger, Paul A., 4,695,019, Cl. 248-74.300.

Aida, Satoru: *See*—
Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, 4,695,007, Cl. 242-58.400.

Air Products and Chemicals, Inc.: *See*—
Garg, Diwakar; Givens, Edwin N.; and Schweighardt, Frank K., 4,695,369, Cl. 208-112.000.

Aisan Kogyo Kabushiki Kaisha: *See*—
Nomura, Yoshihisa; Suda, Koichi; and Kozawa, Tadashi, 4,694,734, Cl. 92-130.00R.

Aisin Seiki Kabushiki Kaisha: *See*—
Kito, Masahiro; and Mori, Katsuhiro, 4,694,894, Cl. 165-135.000.
Kobayashi, Daisaku; Itaba, Tunesaku; and Momose, Yutaka, 4,694,707, Cl. 74-606.00A.
Kodama, Hisashi; and Okabe, Yoshio, 4,695,268, Cl. 474-110.000.
Yukimoto, Kazuyoshi; Fukura, Kenichi; and Yamauchi, Nobuhiro, 4,695,036, Cl. 254-126.000.

Ajinomoto Co., Inc.: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, 4,695,651, Cl. 560-141.000.

Akaiwa, Kiriko: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, 4,695,651, Cl. 560-141.000.

Akashi, Tamotsu; and Sawaoka, Akira, to New Mexico Tech Research Foundation. Dynamic compaction of composite materials containing diamond. 4,695,321, Cl. 75-243.000.

Akatsuka, Takao: *See*—
Nakano, Jiro; Ishibashi, Takao; Akatsuka, Takao; and Kawaguchi, Masao, 4,694,809, Cl. 123-489.000.

Akiyama, Noboru: *See*—
Nakajima, Takayuki; Aoki, Tetsuo; Kobayashi, Katsumi; and Akiyama, Noboru, 4,696,004, Cl. 371-25.000.

Aktiebolaget ASEA ATOM: *See*—
Nylund, Olov, 4,695,426, Cl. 376-441.000.

Aktiebolaget Hassle: *See*—
Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., 4,695,272, Cl. 604-84.000.

Aktiebolaget Iggesunds Bruk: *See*—
Holmberg, Erne L.; and Andersson, Torbjorn C., 4,694,995, Cl. 241-92.000.

Aktieselskabet Laur.Knudsen Nordisk Elektricitets Selskab: *See*—
Leth-Olson, Henrik; and Marot, Lajos K. D., 4,695,691, Cl. 200-303.000.

Akutagawa, Susumu: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Albert Rosink Maschinenbau: *See*—
Rosink, Albert, deceased, 4,694,540, Cl. 19-159.00R.

Albizzati, Enrico; Pettenati, Enrico; Zucchini, Umberto; and Cuffiani, Illaro, to Montedison S.p.A. Catalysts for homo- and copolymerization of ethylene and the polymers obtained by use thereof. 4,695,558, Cl. 502-123.000.

Alcatel N.V.: *See*—
Oen, Sverre; Poppe, Dag; and Tronsli, Sverre N., 4,695,935, Cl. 363-21.000.

Alderman, Daniel A., to Dow Chemical Company, The. Sustained release dosage form based on highly plasticized cellulose ether gels. 4,695,464, Cl. 424-449.000.

Aldinger, Gunther. Endoprosthesis. 4,695,283, Cl. 623-23.000.

Allada, Sambasiva R., to Dow Chemical Company, The. Method for reducing residual monomers from oversized fat imbibing copolymer beads. 4,695,621, Cl. 528-483.000.

Allegheny Ludlum Corporation: *See*—
Knauss, William F., Jr.; Pal, Uday B.; and Patil, Balaji V., 4,695,318, Cl. 75-51.100.

Allied Corporation: *See*—
Cordova, Colleen W.; and Rowan, Hugh H., 4,695,509, Cl. 428-267.000.
Li, Hsin L.; and Prevorsek, Dusan C., 4,695,240, Cl. 425-207.000.
Nagy, Monte L., Jr.; and Cole, Charles J., 4,695,497, Cl. 428-96.000.

Nalewajek, David; Kim, Jung T.; and McCurry, Lynn E., 4,695,522, Cl. 429-206.000.
Ratchford, Lloyd G., 4,695,109, Cl. 439-155.000.
Shackiette, Lawrence W.; Toth, James E.; and Eisenbaumer, Ronald L., 4,695,521, Cl. 429-194.000.
Zupancic, Joseph J.; and Swedo, Raymond J., 4,695,483, Cl. 427-244.000.
Allpack Industrielle Lohnverpackung GmbH & Co. KG: *See*—
Lauk, Willi, 4,695,277, Cl. 604-304.000.
Allyn, Jerome B.: *See*—
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.
Aloisio, Leonard. Emergency air system for partially submerged vessels. 4,694,768, Cl. 114-71.000.
Alpine Electronics Inc.: *See*—
Suzuki, Shoji, 4,694,983, Cl. 226-181.000.
Alps Electric Co., Ltd.: *See*—
Hatanai, Takashi; and Nakashima, Keishi, 4,695,512, Cl. 428-408.000.
Noda, Yasuhiko, 4,695,692, Cl. 200-335.000.
Alsthom: *See*—
Doyen, Gerard, 4,694,533, Cl. 16-257.000.
Obrecht, Georges, 4,694,914, Cl. 175-61.000.
Alten, Kurt. Transfer bridge. 4,694,522, Cl. 14-71.100.
Altmann, Horst-Dieter; and Haupt, Eberhard, to I.G. Bauerhin GmbH Elektro-Technische Fabrik. Heat conductor connections between seats and backrests of vehicles. 4,695,091, Cl. 297-180.000.
Alton, Norman K.; Peters, Mary A.; Stabinsky, Yitzhak; and Snitman, David, to Amgen. Consensus human leukocyte interferon. 4,695,623, Cl. 530-351.000.
Altwicker, Gerhard H. J., to William Prym-Werke GmbH. & Co. KG. Automatic riveting press. 4,694,984, Cl. 227-18.000.
Aluminum Company of America: *See*—
Christini, Roy A.; and Frizzell, Kenneth P., 4,695,320, Cl. 75-67.00A.
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, to Kabushiki Kaisha Kobe Seiko Sho. Central mechanism in a tire vulcanizing press. 4,695,234, Cl. 425-23.000.
Amark Industries, Inc.: *See*—
Williams, David E.; and Hoyt, Edwin D., 4,695,703, Cl. 219-212.000.
Amazonen Werke H. Dreyer GmbH & Co. KG: *See*—
Dreyer, Heinz; Scheufler, Bernd; Wiemeyer, Benno; and Luhrmann, Johannes, 4,694,759, Cl. 111-85.000.
Ambrozaitis, John J.: *See*—
Hart, Robert D.; and Ambrozaitis, John J., 4,694,599, Cl. 40-449.000.
Amemori, Hiroyuki; Nishiyama, Shigeru; and Iwamoto, Tetsuo, to Tokico Ltd. Vortex shedding flowmeter. 4,694,702, Cl. 73-861.240.
Amerasia International Technology, Inc.: *See*—
Kwong, Chung T., 4,695,404, Cl. 252-514.000.
American Can Company: *See*—
Godar, Joseph L., 4,695,492, Cl. 428-35.000.
American Cyanamid Company: *See*—
Walgenbach, Paul J., 4,695,564, Cl. 514-127.000.
American Home Products Corporation: *See*—
Boyle, John T. A.; and Todd, Richard S., 4,695,574, Cl. 514-313.000.
American Red Cross: *See*—
Holme, Stein, 4,695,460, Cl. 424-101.000.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Berkstresser, George W.; and Shmulovich, Joseph, 4,695,762, Cl. 313-474.000.
Gordon, Eugene I.; and Levy, Uri, 4,695,332, Cl. 437-126.000.
Hansen, Terris L.; Hyatt, Wayne E.; and Leung, Wu-Hon F., 4,695,977, Cl. 364-900.000.
Lebowitz, Joseph, 4,694,561, Cl. 437-52.000.
Payne, William A., III, 4,696,000, Cl. 370-60.000.
Sollenberger, Nelson R., 4,695,969, Cl. 364-724.000.
American Telephone and Telegraph Company AT&T-Technologies: *See*—
Everhart, Robert W.; and Huck, Charles T., 4,695,836, Cl. 340-750.000.
Ameron, Inc.: *See*—
Mowrer, Norman R., 4,695,618, Cl. 528-55.000.
Amgen: *See*—
Alton, Norman K.; Peters, Mary A.; Stabinsky, Yitzhak; and Snitman, David, 4,695,623, Cl. 530-351.000.
Amirsakis, Charles J., to Morton Thiokol, Inc. Electron beam curable polyuethane polymers for magnetic tape applications. 4,695,604, Cl. 525-28.000.
AMISTAR Corporation: *See*—
Rudolph, John M.; and Wohlhieter, George M., 4,694,570, Cl. 29-740.000.
AMP Incorporated: *See*—
Feldman, Steven; and Tennant, Robert J., 4,695,106, Cl. 439-83.000.
Grabbe, Dimitry; Korsunsky, Iosif; Klunk, Thomas M.; and DiOrazio, Joseph S., 4,695,111, Cl. 439-266.000.
Ney, Reuben E.; Pass, Raymond V.; and Yeager, Patrick F., 4,695,105, Cl. 439-95.000.
Wasserlein, Henry G., 4,695,110, Cl. 439-289.000.
Ampex Corporation: *See*—
Beaulier, Daniel A., 4,695,876, Cl. 358-31.000.
Smith, Terrance, 4,695,873, Cl. 358-13.000.
Anastassiou, Dimitris; and Pennebaker, William B., to International Business Machines Corporation. Correction of shading effects in video images. 4,695,884, Cl. 358-163.000.
Ance, Louis: *See*—
Carswell, Joseph; and Ance, Louis, 4,695,018, Cl. 248-74.200.
Anchor Hocking Corporation: *See*—
Hayes, Thomas H., 4,694,970, Cl. 215-252.000.
Anderson, Laurel L. Fishing device. 4,694,603, Cl. 43-21.200.
Anderson, Patricia P.: *See*—
Takekoshi, Tohru; and Anderson, Patricia P., 4,695,612, Cl. 525-433.000.
Anderson, Paul T.; Irwin, Lawrence; Matthews, John C.; and Paugh, Charles E., to Babcock & Wilcox Company, The. Vacuum sealing device for insulated steam injection tubing. 4,694,634, Cl. 53-88.000.
Anderson, Robert W., to Anson Limited. Swivel pipe joint. 4,695,078, Cl. 285-98.000.
Andersson, Goran: *See*—
Forslund, Alf; and Andersson, Goran, 4,695,414, Cl. 264-3.100.
Andersson, Sven-Goran B., to Chemical Dynamics Development AB. Method for dealkylation of alkyl-aryl ethers. 4,695,659, Cl. 568-805.000.
Andersson, Torbjorn C.: *See*—
Holmberg, Erne L.; and Andersson, Torbjorn C., 4,694,995, Cl. 241-92.000.
Andis, Matthew L. Hair grooming attachment for a curling iron. 4,695,704, Cl. 219-222.000.
Ando, Hideki; and Miki, Takahiro, to Mitsubishi Denki Kabushiki Kaisha. Digital-to-analog converter. 4,695,826, Cl. 340-347.0DA.
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, to Unisys Corporation. Maintenance subsystem for computer network including power control and remote diagnostic center. 4,695,946, Cl. 364-200.000.
Andromaque S.A.: *See*—
Vander Poorten, Henri, 4,695,356, Cl. 204-180.900.
Anic, S.p.A.: *See*—
Caporossi, Adolfo; and Del Signore, Leonello, 4,695,616, Cl. 526-202.000.
Anicon, Inc.: *See*—
Learn, Arthur J.; and DuBois, Dale R., 4,694,778, Cl. 118-728.000.
Annacker, Ralph; and Dietl, Joachim, to Telefunken electronic GmbH. Circuit arrangement having clearing transistors for discharging a Darlington stage. 4,695,807, Cl. 330-310.000.
Anson Limited: *See*—
Anderson, Robert W., 4,695,078, Cl. 285-98.000.
Anthony, Myron L., to Grand Junction Reality Co., Inc. Reduction and disposal of toxic waste. 4,695,448, Cl. 423-659.000.
Anthony, Thomas R.; Lindner, Philip A.; and Tucker, Jewell G., to General Electric Company. Self-aligned double grids for vacuum tubes. 4,695,760, Cl. 313-348.000.
Anttonen, Kauko K.: *See*—
Reunamaki, Pauli T.; Yli-Vakkuri, Erkki P. J.; and Anttonen, Kauko K., 4,695,821, Cl. 338-316.000.
Aoi, Shigeru, to Canon Kabushiki Kaisha. Optical information recording-reproducing apparatus in which the relative position of a primary beam and secondary beams on recording medium is varied during recording and reproduction of information. 4,695,992, Cl. 369-46.000.
Aoki, Tetsuo: *See*—
Nakajima, Takayuki; Aoki, Tetsuo; Kobayashi, Katsumi; and Akiyama, Noboru, 4,696,004, Cl. 371-25.000.
Aono, Shunji: *See*—
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.
Aoshima, Terutaka: *See*—
Yamashita, Kiyoshi; Aoshima, Terutaka; Narita, Ryuuho; and Imai, Masahiro, 4,695,710, Cl. 219-506.000.
Aoyama, Motoo; Maruyama, Hiromi; Umegaki, Kikuo; and Uchikawa, Sadao, to Hitachi, Ltd. Fuel assembly. 4,695,425, Cl. 376-435.000.
Apostolov, Rumen K.: *See*—
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.
Aqua-Aerobic Systems, Inc.: *See*—
Astrom, Gordon L.; Weis, Ronald J.; and Shubert, Wesley M., 4,695,376, Cl. 210-122.000.
Araghi, Mehdi N.: *See*—
Tandon, Jagdish C.; and Araghi, Mehdi N., 4,695,716, Cl. 250-211.00R.
Arai, Ken-ichi: *See*—
Yokota, Takashi; Lee, Frank; Rennick, Donna; and Arai, Ken-ichi, 4,695,542, Cl. 435-68.000.
Arai, Masatoshi: *See*—
Inoue, Yoshio; Arai, Masatoshi; and Inoue, Takeo, 4,695,603, Cl. 524-723.000.
Inoue, Yoshio; Arai, Masatoshi; Sato, Shinichi; and Yokoo, Koji, 4,695,617, Cl. 528-32.000.
Arakawa, Mitsuaki; Fehn, John H.; and Crooks, Lawrence E., to University of California, The Regents of the. Matched quadrature coils for MRI with minimized intercoil coupling. 4,695,801, Cl. 324-318.000.
Araki, Michio: *See*—
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Arinobu, Ichirou, to Mitsubishi Denki Kabushiki Kaisha. Solid state overcurrent detector. 4,695,961, Cl. 364-483.000.

Armbruster, David R., to Acme Resin Corporation. Precured coated particulate material. 4,694,905, Cl. 166-280.000.

Armstrong, John H.: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.

Armstrong, Robert B.: *See*—
Ezernack, Daniel D.; and Armstrong, Robert B., 4,695,367, Cl. 208-106.000.

Arnstein, Robert A.: *See*—
Chandler, Van S.; and Arnstein, Robert A., 4,695,883, Cl. 358-138.000.

Aronson, Eric G.: *See*—
Van Iperen, Willem H. P.; Sandt, Henry J., Jr.; and Aronson, Eric G., 4,695,211, Cl. 410-77.000.

Arzberger, Maximilian: *See*—
Bauer, Karlheinz; and Arzberger, Maximilian, 4,694,915, Cl. 175-91.000.

Asahi Glass Company Ltd.: *See*—
Nakaya, Keiichi; and Tanaka, Kunio, 4,695,445, Cl. 423-635.000.

Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, to Honda Giken Kogyo Kabushiki Kaisha. Air-fuel ratio control system for an internal combustion engine with an atmospheric pressure responsive correction operation. 4,694,803, Cl. 123-440.000.

Asakura, Toshimitsu; and Tagami, Tomoyuki, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 4,694,924, Cl. 180-68.300.

Asano, Masuo, to Brother Kogyo Kabushiki Kaisha. VR type linear stepper motor. 4,695,777, Cl. 318-135.000.

Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., to Gruzinsky Politekhnichesky Institute. Device for electrochemical-etching determination of corrosion resistance of metals. 4,695,360, Cl. 204-404.000.

Asea Aktiebolag: *See*—
Lindholm, Carl-Henrik; and Lundstrom, Christer, 4,695,027, Cl. 248-325.000.
Orring, Bengt, 4,696,014, Cl. 373-89.000.

Ashland Oil, Inc.: *See*—
Goel, Anil B., 4,695,605, Cl. 525-109.000.

Asoshina, Eishi: *See*—
Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, 4,695,598, Cl. 523-400.000.

Astec Components, Ltd.: *See*—
Whittle, Rex W. J., 4,695,936, Cl. 363-21.000.

Asten Group, Inc.: *See*—
Sarrazin, Yvon; and Smolens, Harry D., 4,695,498, Cl. 428-121.000.

Astra Lake Medel Aktiebolag: *See*—
af Ekenstam, Bo T.; and Bovin, Christer, 4,695,576, Cl. 514-330.000.

Astrom, Gordon L.; Weis, Ronald J.; and Shubert, Wesley M., to Aqua-Aerobic Systems, Inc. Floating decanter. 4,695,376, Cl. 210-122.000.

Atlantic Richfield Company: *See*—
Skinner, James L., 4,694,901, Cl. 166-77.000.

Atlas Copco Aktiebolag: *See*—
Ripl, Wilhelm K.; and Verner, Bo L., 4,695,384, Cl. 210-602.000.

Attain, Inc.: *See*—
Haven, Kenneth R., 4,695,024, Cl. 248-281.100.

Atterton and Ellis Limited: *See*—
Bernhard, Stephen, 4,694,613, Cl. 51-34.00C.

Audibert, Francoise: *See*—
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.

Auerbach, Anthony: *See*—
Sachs, Frederick; Auerbach, Anthony; McGarrigle, Richard G.; and Neil, James E., 4,695,709, Cl. 219-494.000.

August Froscher G.m.b.H. & Co. K.G., Firma: *See*—
Suhr, Heinz-Peter; and Weinberger, Bernd, 4,695,093, Cl. 297-300.000.

Ault, Robert M., to TRE Corporation. Honeycomb core load bearing structure. 4,695,495, Cl. 428-73.000.

Ausnit, Steven; and Bentsen, Per, to Minigrip, Inc. Maintaining single link chain bags against skewing. 4,694,959, Cl. 206-390.000.

Automation Service Equipment, Inc.: *See*—
Murphy, Robert E.; Ballard, Gary R.; and Kuechenmeister, Rodney D., 4,694,953, Cl. 198-627.000.

Avar, Lajos, to Sandoz Ltd. Tetraalkylpiperidines. 4,695,600, Cl. 524-103.000.

AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H., Prof.Dr.Dr.h.c. Hans Cist: *See*—
Bilek, Andreas; and Wunsche, Peter, 4,694,786, Cl. 123-73.0AD.

Avram, Elena: *See*—
Revici, Emanuel, 4,695,583, Cl. 514-449.000.

Axia Incorporated: *See*—
Reed, Larry T., 4,695,161, Cl. 356-254.000.

Azimi, Hossein. Modular block and modular structural elements constructed therefrom. 4,694,629, Cl. 52-611.000.

Azuray Inc.: *See*—
Lau, Robert S.; Murphy, Roy E.; and Quick, Robert G., Jr., 4,695,772, Cl. 315-370.000.

A2F: *See*—
Faisandier, Yves, 4,695,955, Cl. 364-413.000.

B & B Chlorination: *See*—
Behrens, Kelly D., 4,694,900, Cl. 166-75.100.

Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, to NEC Corporation. Superlattice semiconductor having high carrier density. 4,695,857, Cl. 357-16.000.

Babcock & Wilcox Company, The: *See*—
Anderson, Paul T.; Irwin, Lawrence; Matthews, John C.; and Paugh, Charles E., 4,694,634, Cl. 53-88.000.

Badger Company, Inc., The: *See*—
Whittle, Leslie F., 4,695,664, Cl. 585-440.000.

Bagby, John P.; and Hedden, Richard L., to Hughes Aircraft Company. Plural-zone mirror focusing system. 4,695,139, Cl. 350-620.000.

Baggio, Giorgio; and Balbinot, Renzo, to Nordica S.p.A. Closure device particularly for rear entrance ski boots. 4,694,592, Cl. 36-117.000.

Bagolin, Alain; and Gay, Joel, to Frimair S.A. Dry cleaning machine. 4,694,588, Cl. 34-77.000.

Baigent Maurice G., to AEPLC. Structural bearing. 4,695,169, Cl. 384-36.000.

Bailey, James R.; and Basov, Emma, to Switchcraft, Inc. Stacked electrical jacks. 4,695,116, Cl. 439-188.000.

Baird, Elldon: *See*—
Overman, Patrick, Sr.; and Baird, Elldon, 4,694,516, Cl. 5-93.00R.

Bajgrowicz, Edward J.: *See*—
Heckaman, Douglas E.; Higman, Roger H.; Frisco, Jeffrey A.; and Bajgrowicz, Edward J., 4,695,810, Cl. 333-1.000.

Baker, Dean M.: *See*—
Colvell, William F.; and Baker, Dean M., 4,694,569, Cl. 29-724.000.

Baker, Joseph G.: *See*—
Sparkes, Laurie R.; and Baker, Joseph G., 4,694,773, Cl. 114-354.000.

Baker, Peotr: *See*—
Zaehringer, Edmund; Baker, Peotr; and Zettel, Rolf, 4,696,018, Cl. 375-82.000.

Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., to Redland Roof Tiles Limited. Method and apparatus for manufacturing roof tiles and tiles made thereby. 4,695,418, Cl. 264-151.000.

Bakow, Leon: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.

Balbinot, Renzo: *See*—
Baggio, Giorgio; and Balbinot, Renzo, 4,694,592, Cl. 36-117.000.

Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G. Disubstituted ethanes and their use in liquid crystal materials and devices. 4,695,131, Cl. 350-350.00R.

Ballantine Laboratories, Inc.: *See*—
Katzmann, Fred L., 4,695,793, Cl. 324-106.000.

Ballard, Gary R.: *See*—
Murphy, Robert E.; Ballard, Gary R.; and Kuechenmeister, Rodney D., 4,694,953, Cl. 198-627.000.

Balleis, Peter, to Lorenz Bolz GmbH & Co. Toy spinning top having a leg support. 4,695,263, Cl. 446-256.000.

Ballentine, Richard E.; and Henson, Robert M., to J. W. Harris Company. Solder composition. 4,695,428, Cl. 420-561.000.

Bally Manufacturing Corporation: *See*—
Vazquez, Hilario, Jr.; and Yarnold, Paul R., 4,695,053, Cl. 273-143.00R.

Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, to BASF Aktiengesellschaft. Preparation of acyloxybenzenesulfonic acids and their alkali metal and alkaline earth metal salts. 4,695,412, Cl. 260-507.00R.

Bammel, Stanley E.: *See*—
Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., 4,695,246, Cl. 431-31.000.

Banfi, Claudio, to General Electric Company. Closing delay arrangement for current limiting circuit breaker contacts. 4,695,690, Cl. 200-147.00R.

Banich, Howard P.; and Norton, Daniel E., to Wolverine World Wide, Inc. Toe off athletic shoe. 4,694,591, Cl. 36-102.000.

Banks, David M.: *See*—
Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., 4,695,246, Cl. 431-31.000.

Banno, Hisao, to NGK Spark Plug Co. Ltd. Underwater piezoelectric arrangement. 4,695,988, Cl. 367-154.000.

Banzai, Hideo: *See*—
Fujita, Shigeru; Banzai, Hideo; and Takada, Makoto, 4,695,965, Cl. 364-518.000.

Bar-on, Ari, to Standard Oil Company, The. Preformed, thin-film front contact current collector grid for photovoltaic cells. 4,695,674, Cl. 136-256.000.

Barbu, Stefan; Valkestijn, Leonardus; and van de Kerkhof, Franciscus A. M., to U.S. Philips Corporation. Slave-type interface circuit operating with a series bus. 4,695,839, Cl. 340-825.060.

Bardl, Artur; and Lindner, Manfred, to Siemens Aktiengesellschaft. Apparatus for generating a multi-frequency signal. 4,695,804, Cl. 328-14.000.

Barnes, Andrew C.; and Cummings, Susan G., to Mycogen Corporation. Cellular encapsulation of pesticides produced by expression of heterologous genes. 4,695,455, Cl. 424-93.000.

Barnes, Andrew C.; and Cummings, Susan G., to Mycogen Corporation. Cellular encapsulation of biological pesticides. 4,695,462, Cl. 424-195.100.

Barnett, Daniel J.: *See*—
Battey, James F.; Nelson, Norvell J.; and Barnett, Daniel J., 4,695,348, Cl. 156-647.000.

Barr, John D., to NL Petroleum Products Limited. Rotary drill bits with nozzle former and method of manufacturing. 4,694,919, Cl. 175-393.000.

Barr & Stroud Limited: *See*—
Neil, Iain A., 4,695,119, Cl. 350-1.200.

Barraza, Arthur; and Kearney, Calvin T., to Kidde, Inc. Recirculating toilet pump assembly. 4,695,222, Cl. 415-80.000.

Barre, Lucien, to Thomson-CSF. Package for a surface mountable component. 4,695,927, Cl. 361-400.000.

Barrera, Giorgio, to Officine Meccaniche Pavesi & C. S.p.A. Apparatus for treating stator winding leads. 4,694,560, Cl. 29-564.100.

Barrett, Ronald A., to Tektronix, Inc. Precision remotely-switched attenuator. 4,695,806, Cl. 330-254.000.

Bartlett, Robert L.: *See*—
Snyder, Steven A.; Smith, Jack; Flora, David D.; and Bartlett, Robert L., 4,694,713, Cl. 82-14.00R.

Barton, James C.; Hefner, Robert E.; Reid, Paul A.; and Sable, Frank R., to Caterpillar Industrial Inc. Operator restraint system. 4,694,928, Cl. 180-268.000.

BASF Aktiengesellschaft: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.
Merger, Franz; and Towae, Friedrich, 4,695,645, Cl. 560-24.000.
Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, 4,695,397, Cl. 252-182.000.

Basic American Foods: *See*—
Dover, Jerome J., 4,694,742, Cl. 99-404.000.

Basilowski, Herbert: *See*—
Reimann, Jurgen-Andreas; and Basilowski, Herbert, 4,695,960, Cl. 364-474.000.

Basov, Emma: *See*—
Bailey, James R.; and Basov, Emma, 4,695,116, Cl. 439-188.000.

Battey, James F.; Nelson, Norvell J.; and Barnett, Daniel J., to PSI Star. Copper etching process and product. 4,695,348, Cl. 156-647.000.

Baudelot, Francis E.: *See*—
Montanari, Gerard M.; Baudelot, Francis E.; and Costes, Michel L., 4,695,997, Cl. 370-13.000.

Bauer, Bernhard: *See*—
Schleupen, Richard; Mayer, Ulrich; Bauer, Bernhard; and Langner, Arnd M., 4,696,002, Cl. 371-12.000.

Bauer, Karlheinz; and Arzberger, Maximilian, to Karl Bauer Spezialtiefbau GmbH & Co KG. Slotted wall milling cutter. 4,694,915, Cl. 175-91.000.

Bauer, Kurt H.; and Pins, Heinrich, to Warner Lambert Company. Anhydrous emulsions and the use thereof. 4,695,450, Cl. 424-22.000.

Baughman, Davis L. Method and apparatus for imparting a simple contour to a workpiece. 4,694,672, Cl. 72-53.000.

Bauman, Jack. Submergible laryngoscope battery housing. 4,694,822, Cl. 128-11.000.

Baumgardner, Stephen D.: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.

Baxter Travenol Laboratories, Inc.: *See*—
Christine, William, 4,695,337, Cl. 156-69.000.

Baxter, William R. S.: *See*—
Jones, Robert; Jones, Keith W.; and Baxter, William R. S., 4,694,690, Cl. 73-146.000.

Bayer Aktiengesellschaft: *See*—
Berneth, Horst; and Brack, Alfred, 4,695,633, Cl. 544-286.000.
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.
Haas, Peter, 4,695,630, Cl. 544-75.000.
Harnisch, Horst; and Siegel, Edgar, deceased, 4,695,405, Cl. 252-600.000.
Kalk, Walter; Schundehutte, Karl H.; and Soll, Manfred, 4,695,632, Cl. 544-194.000.
Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, 4,695,563, Cl. 514-105.000.
Maurer, Fritz; and Grohe, Klaus, 4,695,646, Cl. 560-43.000.
Oeckl, Siegfried; Mitschker, Alfred; Lange, Peter M.; and Martinola, Friedrich, 4,695,556, Cl. 502-11.000.
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.
Schwabe, Peter; and Voigt, Reiner, 4,695,322, Cl. 106-35.000.
Seng, Florin; and Bremen, Josef, 4,695,652, Cl. 564-343.000.

BBC Brown, Boveri & Company, Limited: *See*—
Canay, Muzaffer, 4,695,939, Cl. 363-39.000.
Hellat, Jaan; and Keller, Jakob, 4,695,225, Cl. 415-189.000.

Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, to Univ. of Tennessee Research Corp. Synthetic peptide compounds. 4,695,562, Cl. 514-13.000.

Bearss, James G.: *See*—
Hackleman, David E.; Bearss, James G.; and Bhaskar, Eldurkar V., 4,695,853, Cl. 346-140.00R.

Beaulier, Daniel A., to Ampex Corporation. Method and apparatus for the extraction of luminance information from a video signal using a field store. 4,695,876, Cl. 358-31.000.

Bech, Marcus C.; and Koster, Ole, to Stormax International A/S. Method and apparatus for grouping, orienting, and packing articles. 4,694,637, Cl. 53-448.000.

Bechtel International Corporation: *See*—
Wallace, Norman R., 4,695,189, Cl. 405-169.000.

Bechtolsheimer, Hans-Heinrich: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Beck, Richard, Jr., to Sundstrand Corporation. Anti-plug control. 4,694,648, Cl. 60-452.000.

Becker, Benedikt: *See*—
Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, 4,695,563, Cl. 514-105.000.

Becker, E. Robert; and Jung, Hyun J., to Johnson Matthey, Inc. Selective catalytic reduction catalysts. 4,695,438, Cl. 423-239.000.

Becker, Hans; and Linde, Gerhard, to Linde Aktiengesellschaft. Process and apparatus for distillation and/or stripping. 4,695,349, Cl. 203-26.000.

Beckman Instruments, Inc.: *See*—
Goodale, David L.; and Darden, Nick, 4,694,861, Cl. 137-624.190.

Becton Dickinson and Company: *See*—
O'Connell, James P.; Piran, Uri; and Wagner, Daniel B., 4,695,554, Cl. 436-528.000.

Becton Dickinson and Co., Inc.: *See*—
Wardlaw, Stephen C.; Levine, Robert A.; Rodriguez, Rodolfo R.; and Loken, Michael R., 4,695,553, Cl. 436-177.000.

Bedekovic, Davor; and Fletcher, Ian J., to Ciba-Geigy Corporation. Chromogenic dihydrofuropyridinones. 4,695,636, Cl. 546-116.000.

Bedrij, Orest J., to Profit Technology, Inc. Multi-image communications system. 4,695,975, Cl. 364-900.000.

Beebe International, Inc.: *See*—
Smith, Glenn S., 4,695,010, Cl. 242-158.00R.

Behrens, Kelly D., to B & B Chlorination. Dry pellet dispensing device for wells. 4,694,900, Cl. 166-75.100.

Behrenz, Wolfgang: *See*—
Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, 4,695,563, Cl. 514-105.000.

Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., to Lennox Industries, Inc. Ignition control system for a gas appliance. 4,695,246, Cl. 431-31.000.

Beining, August H.; Dial, Larry A.; Smith, William A.; and Rieck, Gene W., to Hughes Aircraft Company. Electromagnetic energy interference seal for light beam touch panels. 4,695,827, Cl. 340-365.00P.

Beisemann, Heinz: *See*—
Predohl, Wilhelm; Beisemann, Heinz; and Reitemeyer, Paul, 4,695,236, Cl. 425-131.100.

Beisler, Alfons, to Beisler GmbH. Device for transferring a fabric strip from a deposit station. 4,694,767, Cl. 112-303.000.

Beisler GmbH: *See*—
Beisler, Alfons, 4,694,767, Cl. 112-303.000.

Bell, James A.: *See*—
Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,695,578, Cl. 514-397.000.

Bell, Noel G. Traveling trench shore. 4,695,204, Cl. 405-283.000.

Bell of Pennsylvania: *See*—
McDermott, Michael G., 4,695,926, Cl. 361-395.000.

Belleau, Gordon F.; Jelcin, Michael J.; and Verga, Charles F., to General Motors Corporation. Method of forming truck cab frames. 4,695,342, Cl. 156-173.000.

Bellingham, Ronald S.; and White, Malcolm J., to Chubb & Son's Lock and Safe Company Limited. Shackle mechanisms. 4,694,666, Cl. 70-16.000.

Belouet, Christian, to Compagnie Generale d'Electricite; and Societe Nationale Elf Aquitaine. Method and apparatus for drawing a tape constituted by a support coated in a layer of semiconductor material, said tape being drawn from a liquid bath of said material. 4,695,480, Cl. 437-225.000.

Benchmark Industries Incorporated: *See*—
Schoenbaum, Gary L.; Latanzi, Lewis A.; Hedrick, Stephen L.; and Johnson, Harold V., 4,695,157, Cl. 356-237.000.

Bennett, David E., to Impco Carburetion, Inc. Air-gas mixing device with dual-control fuel valve. 4,694,811, Cl. 123-527.000.

Benoit, Roland A., to Gem Industries, Inc. Corner bracket. 4,694,519, Cl. 5-200.00C.

Bentsen, Per: *See*—
Aunit, Steven; and Bentsen, Per, 4,694,959, Cl. 206-390.000.

Beral Bremsbelag GmbH: *See*—
Jonas, Siegfried, 4,694,937, Cl. 188-73.100.

Berecz, Imre, to Microdot Inc. Composite channel and plate nut assembly. 4,695,212, Cl. 411-85.000.

Berg, Lloyd. Separation of n-hexyl acetate from n-hexyl alcohol by extractive distillation. 4,695,350, Cl. 203-51.000.

Berger, Herbert: *See*—
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.

Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., to Aktiebolaget Hassle. Drug release device. 4,695,272, Cl. 604-84.000.

Bergstrom, Michael: *See*—
Gent, Derek J.; and Bergstrom, Michael, 4,695,774, Cl. 315-408.000.

Berkhof, Hendrikus, to Honeywell B.V. Hot water heating system using a heat consumption meter. 4,695,052, Cl. 237-8.00R.

Berkowitz, Phillip T., to Olin Corporation. Stable, low viscosity polymer/polyisocyanate dispersion. 4,695,596, Cl. 521-137.000.

Berkstresser, George W.; and Shmulovich, Joseph, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Electron beam pumped rod-like light emitters. 4,695,762, Cl. 313-474.000.

Berl, Marta N.; and Turner, Esther. Toothbrush. 4,694,844, Cl. 132-84.00R.

Berleth, Manfred, to Cambridge Instruments GmbH. Specimen holder clamp for a microtome. 4,695,046, Cl. 269-210.000.

Berneth, Horst; and Brack, Alfred, to Bayer Aktiengesellschaft. Chromogenic 4,4-diaryl-dihydroquinazolones, their preparation and their use. 4,695,633, Cl. 544-286.000.

Bernhard, Stephen, to Atterton and Ellis Limited. Relief grinding of lawn mower cylindrical blades. 4,694,613, Cl. 51-34.00C.

Berry, Jimmy D.: *See*—
Pettibone, Craig R.; and Berry, Jimmy D., 4,695,073, Cl. 280-690.000.

Berry, W. Wes, to Advanced Separation Technologies Incorporated. Process for the decolorization of pulp mill process streams. 4,695,386, Cl. 210-665.000.

Berry, W. Wes; and Erickson, William R., to Advanced Separation Technologies Incorporated. Removal of ammonia from wastewater. 4,695,387, Cl. 210-676.000.

Berwind Corporation: *See*—
Fleckenstein, Phillip P.; and Marsh, Norman F., 4,695,685, Cl. 200-61.210.

Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, to Chevron Research Company. Removable bottom founded structure. 4,695,201, Cl. 405-224.000.

Bespalova, Zhanna D.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., to Smith International, Inc. Pressure-balanced stab connection. 4,695,190, Cl. 405-169.000.

Beyer, Karl-Heinz: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Bhalaik, Arun; Braddick, Peter W.; Brittin, Darryl S.; and Johnson, Gerald L., to Santa Fe International Corporation. Mobile marine operations structure. 4,695,194, Cl. 405-207.000.

Bhaskar, Eldurkar V.: *See*—
Hackleman, David E.; Bearss, James G.; and Bhaskar, Eldurkar V., 4,695,853, Cl. 346-140.00R.

Bhula, Dilipkumar N.: *See*—
Watt, Brian J.; Bhula, Dilipkumar N.; and Birdy, Jal N., 4,695,197, Cl. 405-224.000.

Biethan, Uwe: *See*—
Olbrich, Juergen; Biethan, Uwe; and Sorge, Gernold, 4,695,613, Cl. 525-533.000.

Bifa Corporation: *See*—
Fabbro, Miguel, 4,694,816, Cl. 126-41.00R.

Bilek, Andreas; and Wunsche, Peter, to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H., Prof.Dr.Dr.h.c. Hans Cist. One-cylinder, two-stroke internal combustion engine with crankcase scavenging. 4,694,786, Cl. 123-73.0AD.

Billard, Alain, to Societe E. Lacrois - Tour Artifices. Method for deceiving active electromagnetic detectors and corresponding decoys. 4,695,841, Cl. 342-8.000.

Billet, Daniel; and Cesarini, Jean F., to Thomson CSF. Device for detecting and locating penetration of water into a marine acoustic streamer. 4,695,787, Cl. 324-557.000.

Bimonte, Michael; and Cleary, Dennis. Apparatus for refuse collection and disposal. 4,694,972, Cl. 220-401.000.

Bio/Data Corporation: *See*—
Coville, William E.; Grossman, Hyman; and Sokol, Michael, 4,695,430, Cl. 422-65.000.

Birdy, Jal N.: *See*—
Watt, Brian J.; Bhula, Dilipkumar N.; and Birdy, Jal N., 4,695,197, Cl. 405-224.000.

Bishop, David I.: *See*—
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

Bishop, John F., to Eastman Kodak Company. Poly(ethylene oxide) stripping agents for photographic products. 4,695,526, Cl. 430-215.000.

Bjorheden, Orvar: *See*—
Flyborg, Nils O.; and Bjorheden, Orvar, 4,694,645, Cl. 60-221.000.

Black, Alee R. Rod support system having end brackets and auxiliary support brackets. 4,694,532, Cl. 16-94.00D.

Blair, Preston E.; and Preston, Frank S. TV animation interactively controlled by the viewer. 4,695,953, Cl. 364-410.000.

Blake, Rodger D.: *See*—
Meek, Thomas T.; and Blake, Rodger D., 4,695,695, Cl. 219-10.55M.

Blakeley, Douglas M.; Kershaw, Carolyn A.; and Gangarosa, Raymond E., to Picker International, Inc. Cardiac and respiratory gated magnetic resonance imaging. 4,694,837, Cl. 128-653.000.

Blanchard, Pierre; Descure, Pierrick; and Chautemps, Jacques, to Thomson-CSF. Gate structure for an integrated circuit comprising elements of the gate-insulator-semiconductor type and a method of fabrication of an integrated circuit using said structure. 4,695,860, Cl. 357-24.0LR.

Blaney, Peter G., to Zemco Group, Inc. Electronic automotive compass and display. 4,694,583, Cl. 33-361.000.

Blasczyk, Gotthardt: *See*—
Henne, Heinrich; Blasczyk, Gotthardt; Eickholt, Hubert; and Lohnherr, Ludger, 4,694,994, Cl. 241-79.100.

Blevins, Ballard J.; Kulpa, William G.; Mathis, Joseph R.; and McCullough, John W., to International Business Machines Corporation. Bus to bus converter using a RAM for multiple address mapping. 4,695,948, Cl. 364-200.000.

Blount, David H. Process for the production of cellular organic silicate products. 4,695,595, Cl. 521-99.000.

Bloy, Graham P.; and Miramonti, John L., to Metme Communications. Analog-digital conversion system. 4,695,825, Cl. 340-347.0SH.

Boag, James T., to Colorado Medical, Inc. Dialyzer reuse system. 4,695,385, Cl. 210-636.000.

Bocciarelli, Louis R.: *See*—
Marchitto, Michael J.; and Bocciarelli, Louis R., 4,695,226, Cl. 416-106.000.

Bochard, Michel; and Lafaye, Michel, to La Telemecanique Electrique. Electric safety switch. 4,695,684, Cl. 200-43.070.

Bock, Wolfgang: *See*—
Kortmann, Heinrich; and Bock, Wolfgang, 4,695,315, Cl. 75-0.50R.

Boden, Heinrich: *See*—
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.

Bodine, Albert G. Sonic impeller for sonic well pump. 4,695,231, Cl. 417-241.000.

Boecker, Wolfgang D. G.: *See*—
Korzekwa, Tadeusz M.; McMurtry, Carl H.; and Boecker, Wolfgang D. G., 4,695,294, Cl. 51-307.000.

Boehringer Mannheim GmbH: *See*—
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.
Schmitt, Urban; Deeg, Rolf; and Ziegenhorn, Joachim, 4,695,552, Cl. 436-66.000.
Zivitz, Maury; Ko, Eric; and Eslick, Mark, 4,695,164, Cl. 356-427.000.

Boeing Company, The: *See*—
McKinney, Donald L., 4,694,998, Cl. 242-1.000.

Boerger, Daniel A. Clipper attachment device. 4,694,575, Cl. 30-221.000.

Bogdanovic, Borislav, to Studiengesellschaft Kohle mbH. Method of separating and purifying hydrogen. 4,695,446, Cl. 423-648.00R.

Bolte, Steven B.: *See*—
Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., 4,695,524, Cl. 430-32.000.

Bonin, Wayne A.; McCumber, Roger D.; and Teder, Rein S., to Vericom Corporation. Vehicle performance analyzer. 4,694,687, Cl. 73-116.000.

Bononi, Walter H. Pad. 4,695,140, Cl. 351-139.000.

Bonta, Jeffrey D., to Motorola, Inc. Handoff apparatus and method with interference reduction for a radio system. 4,696,027, Cl. 379-60.000.

Boodanian, Leon P.: *See*—
Magdesyan, Garnik; Magdesyan, Stepan; and Boodanian, Leon P., 4,695,118, Cl. 439-726.000.

Boots, Gordon C., to A. Duda & Sons, Inc. Single pass sod cutting machine for producing hexagonally shaped plugs. 4,694,717, Cl. 83-222.000.

Borchert, Werner, to GEA Energiesystemtechnik GmbH & Co. Apparatus for retrieving spherically shaped cleansing bodies. 4,694,892, Cl. 165-95.000.

Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, to Eszakmagyarorszagi Vegyimuvek. Composition for prolonging the action of herbicides and herbicide compositions with a prolonged action. 4,695,309, Cl. 71-88.000.

Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, to Eszakmagyarorszagi Vegyimuvek. Composition for prolonging the action of herbicides and herbicide compositions with a prolonged action. 4,695,313, Cl. 71-100.000.

Borg-Warner Automotive, Inc.: *See*—
Hall, David A.; and Yuergens, Kenneth C., 4,694,941, Cl. 192-3.280.

Borg-Warner Chemicals, Inc.: *See*—
Halpern, Yuval, 4,695,601, Cl. 524-362.000.

Borg-Warner Corporation: *See*—
Fildes, John M.; and Krueger, Robert H., 4,694,686, Cl. 73-104.000.

Borgmann, Robert E.: *See*—
Monteith, Robert C.; and Borgmann, Robert E., 4,695,701, Cl. 219-121.0LV.

Borodulin, Anatoly F.: *See*—
Gendelman, Mikhail A.; Borodulin, Anatoly F.; Golubeva, Diana F.; and Bychkov, Sergei V., 4,694,867, Cl. 139-192.000.

Bos, Jacobus J.; Cuperus, Rinze; and Wielinga, Rudolf, to Gist-Brocades N.V. Preparation of 6-amino-penicillanic acid-1,1-dioxide. 4,695,628, Cl. 540-312.000.
Boshold, Raymond F., to Wean Industries, Inc. Container guidance system for extrusion press. 4,694,673, Cl. 72-272.000.
Boston, Ronald P., to Fronda Limited. Process for producing carbonated beverages. 4,695,468, Cl. 426-8.000.
Botstein, David; Fink, Gerald R.; and Davis, Ronald W., to Collaborative Research, Inc. Rennin-containing disrupted yeast cells used in cheese manufacture. 4,695,470, Cl. 426-37.000.
Bottom, Michael T., to T. J. Bottom Industries, Inc. Knock-down adjustable awning construction. 4,694,876, Cl. 160-45.000.
Bouchard, Roland D. Garbage truck with trash bin cleaning system. 4,694,846, Cl. 134-78.000.
Boucharlat, Gilles; and Brissot, Louis, to Thomson-CSF. Line transfer reading device with feedback regulating the drive charge. 4,695,890, Cl. 358-213.310.
Boulder 12 Investments: *See*—
Petrak, Harry A., 4,694,943, Cl. 192-35.000.
Boumendil, Jean-Paul: *See*—
Cousin, Stephane; and Boumendil, Jean-Paul, 4,695,338, Cl. 156-71.000.
Boussert, Anne S., to Dow Chemical Company, The. Removal of unsaturated hydrocarbons in anhydrous hydrogen halide by infrared laser radiation. 4,695,357, Cl. 204-157.410.
Bouygues: *See*—
Richard, Pierre, 4,694,622, Cl. 52-223.00R.
Bouyoucos, John V., to Hydroacoustics Inc. Hydroacoustic apparatus. 4,695,987, Cl. 367-143.000.
Bovin, Christer: *See*—
af Ekenstam, Bo T.; and Bovin, Christer, 4,695,576, Cl. 514-330.000.
Bowles Fluidics Corporation: *See*—
Stouffer, Ronald D., 4,694,992, Cl. 239-265.230.
Bowsher, Glynne T., to Lucas Industries Public Limited Company. Pedal device. 4,695,819, Cl. 338-153.000.
Box, Richard B.: *See*—
Sullivan, James B.; and Box, Richard B., 4,694,589, Cl. 36-44.000.
Boyer, Elton W. Ambulatory vehicle carrier. 4,695,218, Cl. 414-462.000.
Boykin, Richard C. Vent window securing device for vans and trucks. 4,695,081, Cl. 292-96.000.
Boyle, John T. A.; and Todd, Richard S., to American Home Products Corporation. 4-Quinolinylamino-N-[pyrrolidinyl or piperdinyl)alkyl]-benzenesulphonamides. 4,695,574, Cl. 514-313.000.
Bracht, Roger R.: *See*—
Steenbergen, Christiaan; Howard, Peter G.; Bracht, Roger R.; and van der Put, Henk, 4,695,994, Cl. 369-54.000.
Brack, Alfred: *See*—
Berneth, Horst; and Brack, Alfred, 4,695,633, Cl. 544-286.000.
Braddick, Peter W.: *See*—
Bhalaik, Arun; Braddick, Peter W.; Brittin, Darryl S.; and Johnson, Gerald L., 4,695,194, Cl. 405-207.000.
Bradlow, H. Leon: *See*—
Fleisher, Martin; Bradlow, H. Leon; and Schwartz, Morton K., 4,695,471, Cl. 436-64.000.
Bramwell, Byrne E.: *See*—
Ringer, Thomas R.; and Bramwell, Byrne E., 4,695,017, Cl. 246-428.000.
Brande, Bruce R. Folding boat dock. 4,695,195, Cl. 405-220.000.
Brandes, Rolf, to University of California, The Regents of the. Method and apparatus for generating frequency selective pulses for NMR spectroscopy. 4,695,798, Cl. 324-307.000.
Brandi, Roberto: *See*—
Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, 4,695,193, Cl. 405-204.000.
Brandt, Henry R.; Gannon, Patrick M.; Leung, Wan L.; and Marchini, Timothy R., to International Business Machines Corporation. Fast two-level dynamic address translation method and means. 4,695,950, Cl. 364-200.000.
Brauers, Bert; and Morsbach, Martin, to Goetze AG. Piston ring assembly and expander. 4,695,064, Cl. 277-139.000.
Breckenridge, Virgil H. Agri-chemical spreader. 4,694,991, Cl. 239-171.000.
Breddo, Inc.: *See*—
Forsythe, Curtis J., 4,695,469, Cl. 426-24.000.
Breeden, Robert L., to Motorola Inc. Simulcast transmission system having automtic synchronization. 4,696,051, Cl. 455-33.000.
Breeden, Robert L., to Motorola Inc. Simulcast transmitter apparatus having automatic synchronization capability. 4,696,052, Cl. 455-51.000.
Bremen, Josef: *See*—
Seng, Florin; and Bremen, Josef, 4,695,652, Cl. 564-343.000.
Breuker, Gordon W.: *See*—
Scrivo, Jerry V.; and Breuker, Gordon W., 4,695,433, Cl. 422-112.000.
Brickner, Louis C., Jr.; and Skipworth, Jerry D., to Delta International Machinery Corp. Miter box construction. 4,694,720, Cl. 83-471.300.
Brickner, Louis C., Jr., to Delta International Machinery Corp. Motor pack for circular saw. 4,694,721, Cl. 83-471.300.
Bridgestone Corporation: *See*—
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, 4,695,235, Cl. 425-29.000.
Bridginfill Design Ltd.: *See*—
Mikhailovsky, Leonid; and Ramotar, Jay G., 4,695,187, Cl. 405-124.000.
Bridgwater, Jon, to Morton Metalcraft Company. Fireplace grate for gas fired fireplace including forced air heat exchanger. 4,694,818, Cl. 126-121.000.
Brierley, Philip R.; and Lowry, Stephen R., to Nicolet Instrument Corporation. Optical analytical instrument with automatic sample changing. 4,695,727, Cl. 250-328.000.
Briggs & Stratton Corporation: *See*—
Uuskallio, Arvo F., 4,694,792, Cl. 123-187.50R.
Brighty, Katherine E., to Pfizer Inc. 1-aza-4,5-dithiabicyclo [4.2.0] oct-2-en-8-one-2 carboxylate esters. 4,695,626, Cl. 540-214.000.
BRIntec Corp.: *See*—
Carswell, Joseph; and Ance, Louis, 4,695,018, Cl. 248-74.200.
Brissot, Louis: *See*—
Boucharlat, Gilles; and Brissot, Louis, 4,695,890, Cl. 358-213.310.
Bristol-Myers Company: *See*—
Sloma, Alan, 4,695,543, Cl. 435-70.000.
British Gas Corporation: *See*—
Dickinson, Alan J., 4,694,574, Cl. 30-94.000.
British Petroleum Company p.l.c., The: *See*—
Hall, Antony H. P.; and McCarroll, John J., 4,695,663, Cl. 585-417.000.
Stephenson, Graham W.; and Toft, Richard C., 4,694,909, Cl. 166-359.000.
British Steel Corporation: *See*—
Spenceley, Gene D.; and Henderson, Steven, 4,694,889, Cl. 164-488.000.
British Telecommunications public limited company: *See*—
Else, Ronald, 4,696,033, Cl. 379-424.000.
McKeown, James H. A., 4,695,972, Cl. 364-819.000.
Brittin, Darryl S.: *See*—
Bhalaik, Arun; Braddick, Peter W.; Brittin, Darryl S.; and Johnson, Gerald L., 4,695,194, Cl. 405-207.000.
Brogren, Eric: *See*—
Goodacre, John H.; and Brogren, Eric, 4,695,198, Cl. 405-224.000.
Broken Hill Proprietary Co., Ltd., The: *See*—
Seddon, Duncan, 4,695,670, Cl. 585-533.000.
Brooks, Royce L., to Koerner, Norman D. Athlete carrier. 4,695,072, Cl. 280-650.000.
Brother Kogyo Kabushiki Kaisha: *See*—
Asano, Masuo, 4,695,777, Cl. 318-135.000.
Tomida, Yasutaka, 4,695,173, Cl. 400-120.000.
Ueno, Hideo; Hattori, Hiroshi; Maeda, Kumiko; and Yamada, Keiko, 4,695,172, Cl. 400-83.000.
Broughton, George L.; and Macier, James E., to Outboard Marine Corporation. Marine propulsion engine voltage generator arrangement. 4,695,261, Cl. 440-900.000.
Broussard, Edison L. One-piece metal covering for insulated pipe bends. 4,694,547, Cl. 29-157.00R.
Brown, Chester. Collar for the commutator of an automotive starter. 4,695,755, Cl. 310-236.000.
Brown, Edward M.: *See*—
Proctor, John D.; Towns, Edward J.; and Brown, Edward M., 4,694,968, Cl. 215-224.000.
Brown, Eric W., to I-Flow Corporation. Multiple needle holder and subcutaneous multiple channel infusion port. 4,695,273, Cl. 604-173.000.
Brown, Frederick W.: *See*—
Provence, John D.; Brown, Frederick W.; and Jones, John I., 4,695,700, Cl. 219-121.0PD.
Brown, Gregory D.; Clark, Darrel E.; and Schuermann, Rodger W., to Technical Oil Tools Corporation. Drilling fluid density measurement system. 4,694,692, Cl. 73-155.000.
Brown, Richard A.: *See*—
Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., 4,695,658, Cl. 568-763.000.
Bruce, Donald; and Goode, Richard L. Middle ear ventilation tube. 4,695,275, Cl. 604-264.000.
Brunswick Corporation: *See*—
Swisher, Steven L., 4,695,009, Cl. 242-84.10R.
Bryan, Philip S.; and Herz, Arthur H., to Eastman Kodak Company. Silver halide photosensitive material. 4,695,534, Cl. 430-569.000.
Bryan, Philip S.; and Herz, Arthur H., to Eastman Kodak Company. Silver halide photosensitive material. 4,695,535, Cl. 430-569.000.
Buchler G-Set A.G.: *See*—
Buchler, Rene , 4,695,210, Cl. 409-219.000.
Buchler, Rene , to Buchler G-Set A.G. Apparatus for the machining of workpieces. 4,695,210, Cl. 409-219.000.
Buckley, Thomas F., to Chevron Research Company. Modified succinimides (IX). 4,695,391, Cl. 252-51.50A.
Buckmaster, Kenneth E.: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.
Buckner, Carrol E. Stove with catalytic converter. 4,694,820, Cl. 126-289.000.
Buderus Aktiengesellschaft: *See*—
Feuring, Kurt, 4,694,879, Cl. 164-7.200.
Budzich, Tadeusz, to Caterpillar Inc. Load compensated valve. 4,694,731, Cl. 91-421.000.
Bugg, Richard E. F., to U.S. Philips Corporation. Data display systems. 4,695,835, Cl. 340-750.000.
Buggert, Jerrold E.: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.

Buhler, Hans-Eugen: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Buikman, Dirk; Helzel, Thomas; and Roschman, Peter, to U.S. Philips Corporation. MRI tomography apparatus for generating a motion signal. 4,694,836, Cl. 128-653.000.

Bull, Randy A.: *See—*
Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., 4,695,658, Cl. 568-763.000.

Bunting, Terry N., to Advanced Extraction Technologies, Inc. Process for extractive-stripping of lean hydrocarbon gas streams at high pressure with a preferential physical solvent. 4,695,672, Cl. 585-867.000.

Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., to Stauffer Chemical Company. S-benzyl thiolcarbamates and their use in controlling weeds in rice fields. 4,695,314, Cl. 71-100.000.

Burgman, Herbert A.: *See—*
Lahoda, Edward J.; Burgman, Herbert A.; and Kwon, Young J., 4,695,441, Cl. 423-347.000.

Burke, Lawrence J. Drafting table accessory storage attachment device. 4,694,967, Cl. 211-126.000.

Burlington Industries, Inc.: *See—*
Griffin, Everett, 4,694,636, Cl. 53-399.000.
Schwartz, William C., 4,695,507, Cl. 428-228.000.

Burroughs Wellcome Co.: *See—*
Krenitsky, Thomas A., 4,695,570, Cl. 514-261.000.

Busch, Paul F., to Metcal, Inc. Flexible autoregulating heater with a latching mechanism. 4,695,712, Cl. 219-535.000.

Buschmann, Gerd: *See—*
Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, 4,695,566, Cl. 514-234.000.

Busk, Robert S., to Dow Chemical Company, The. Method for making thixotropic materials. 4,694,881, Cl. 164-113.000.

Busk, Robert S., to Dow Chemical Company, The. Method for making thixotropic materials. 4,694,882, Cl. 164-113.000.

Busson, Christian: *See—*
Galtier, Pierre; and Busson, Christian, 4,695,370, Cl. 208-113.000.

Butler, David R.; and Corbett, Clifford F., to Foseco International Limited. Molten metal casting and feeder sleeves for use therein. 4,694,884, Cl. 164-359.000.

Butler Manufacturing Company: *See—*
Johnston, Bruce L., 4,694,921, Cl. 177-136.000.

Bychkov, Sergei V.: *See—*
Gendelman, Mikhail A.; Borodulin, Anatoly F.; Golubeva, Diana F.; and Bychkov, Sergei V., 4,694,867, Cl. 139-192.000.

Byers, Lance R.: *See—*
Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., 4,695,658, Cl. 568-763.000.

C & C Concepts, Inc.: *See—*
Cornelson, Donald P.; and Carlson, Jess W., 4,695,056, Cl. 273-262.000.

Cabanss, Frank W.; and Lockwood, James M., to NCR Corporation. Varying frequency oscillator for the reduction of radiated emissions of electronic equipment. 4,695,808, Cl. 331-57.000.

Cadaureille, Gerard: *See—*
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, 4,694,585, Cl. 33-502.000.

Cairo, Anthony C.: *See—*
Levine, Michael R.; Russo, James T.; Cairo, Anthony C.; and Rigotti, Victor H., 4,695,942, Cl. 364-188.000.

Cajon Company: *See—*
Klopp, James L., 4,694,863, Cl. 138-96.00R.

California Health Technologies: *See—*
Lippman, Richard D., 4,695,590, Cl. 514-724.000.

Cambridge Instruments GmbH: *See—*
Berleth, Manfred, 4,695,046, Cl. 269-210.000.

Camco, Incorporated: *See—*
Morris, Arthur J.; and Newton, Donald E., 4,694,908, Cl. 166-310.000.

Camp, Joan A. Standing seed planter. 4,694,760, Cl. 111-92.000.

Campbell, Harry J., III. Dynamic balancing for skis. 4,694,684, Cl. 73-65.000.

Canadian Marconi Corporation: *See—*
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.

Canadian Patents and Development Limited: *See—*
Ringer, Thomas R.; and Bramwell, Byrne E., 4,695,017, Cl. 246-428.000.

Canadian Patents and Development Limited-Societe Canadienne des Brevets et D'Exploitation Limitee: *See—*
MacDonald, R. I.; Lam, D. K. W.; and Jenkins, R. W., 4,696,059, Cl. 455-600.000.

Canay, Muzaffer, to BBC Brown, Boveri & Company, Limited. Three-phase exciter for synchronous machines. 4,695,939, Cl. 363-39.000.

Candor, James T.: *See—*
Tassone, Joseph V.; and Candor, James T., 4,695,269, Cl. 474-268.000.

Cannon, Albert W., to Focalpoint Armoury Limited. Improvements in sights for firearms and other articles. 4,695,159, Cl. 356-247.000.

Canon Kabushiki Kaisha: *See—*
Aoi, Shigeru, 4,695,992, Cl. 369-46.000.
Chito, Yasuo; and Ogawa, Masahiko, 4,695,778, Cl. 318-314.000.
Dei, Katsuhito, 4,695,849, Cl. 346-76.00L.
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, 4,695,717, Cl. 250-213.00R.
Ichihashi, Hiroo; Ozawa, Masakazu; Ebinuma, Ryuichi; and Saito, Atsushi, 4,695,855, Cl. 346-145.000.
Kawamoto, Kenichi, 4,695,145, Cl. 354-271.100.
Kimizuka, Junichi; Ushio, Yukihide; and Seto, Kaoru, 4,695,714, Cl. 250-205.000.
Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, 4,695,133, Cl. 350-427.000.
Nagashima, Nao, 4,695,895, Cl. 358-280.000.
Nakayama, Hiroki; Sato, Yasuhisa; and Yamada, Yasuyuki, 4,695,134, Cl. 350-432.000.
Sado, Ichiro, 4,696,048, Cl. 382-13.000.
Saito, Syuichiro; and Okino, Tadashi, 4,695,894, Cl. 358-228.000.
Sawamura, Mitsuharu; Honguu, Kazuoki; and Kikuchi, Kazuhiko, 4,695,510, Cl. 428-336.000.
Shikaumi, Masao, 4,695,149, Cl. 354-430.000.
Suzuki, Eiichi, 4,695,846, Cl. 346-1.100.
Takeda, Masami, 4,695,421, Cl. 264-318.000.
Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, 4,696,008, Cl. 371-47.000.
Tazaki, Shigemitsu, 4,695,824, Cl. 346-140.00R.
Terasawa, Koji, 4,695,851, Cl. 346-140.00R.

Cantatore, Giuseppe, to Ciba-Geigy Corporation. Use of dipiperidine-di-carbamates as stabilizers for synthetic polymers. 4,695,599, Cl. 524-103.000.

Cantor, Charles R.; and Schwartz, David C., to Columbia University in the City of New York, The Trustees of. Gel inserts useful in electrophoresis. 4,695,548, Cl. 435-179.000.

Caporossi, Adolfo; and Del Signore, Leonello, to Anic, S.p.A. Process for polymerization of vinyl chloride in suspension. 4,695,616, Cl. 526-202.000.

Carbotek, Inc.: *See—*
Stahl, Charles R.; Gibson, Michael A.; and Knudsen, Christian W., 4,694,907, Cl. 166-303.000.

Cardinal Industries, Inc.: *See—*
Collier, Ronald T.; and Thompson, Robert E., 4,694,722, Cl. 83-885.000.

Cardo, Carlos C.: *See—*
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.

Carl Freudenberg, Firma: *See—*
Schmitt, Wolfgang; and Forch, Hans, 4,695,063, Cl. 277-134.000.

Carl Hurth Maschinen und Zahnradfabrik GmbH & Co.: *See—*
Loos, Herbert; and Erhardt, Manfred, 4,694,617, Cl. 51-287.000.

Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See—*
Jorgens, Reinhard; Faltermeier, Bernd; and Trautwein, Franz, 4,695,137, Cl. 350-521.000.

Carlach, Jean-Claude, to Etat Francais represent par le Secretariat d'Etat aux Postes et Telecommunications (Centre National d'Etudes des Telecommuncations); and Etablissement Public de Diffusion, dit "Telediffusion de France". Digital circuit for frequency or pulse rate division. 4,696,020, Cl. 377-48.000.

Carlson, E. Ronald: *See—*
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.

Carlson, Jess W.: *See—*
Cornelson, Donald P.; and Carlson, Jess W., 4,695,056, Cl. 273-262.000.

Carlson, Melvin C.; and Dean, Raymond H., to Tempmaster Corporation. Control installation for variable volume air diffusers. 4,694,988, Cl. 236-49.000.

Carlson, Melvin C.; and Dean, Raymond H., to Tempmaster Corporation. Control installation for variable volume air diffusers. 4,694,989, Cl. 236-49.000.

Carmel Medical Devices: *See—*
Chester, Martin H., 4,694,826, Cl. 128-303.00R.

Carmichael, Robert J.: *See—*
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.

Carr Lane Roemheld Manufacturing Co., Inc.: *See—*
Ehrhardt, Winfried; Richter, Klaus; and Lehr, Adolf, 4,695,047, Cl. 269-309.000.

Carrara, Giuseppe. Furnace for the complete, smokeless combustion of liquid or partially liquid materials. 4,694,756, Cl. 110-238.000.

Carraro, Roberto: *See—*
Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, 4,695,193, Cl. 405-204.000.

Cars & Concepts, Inc.: *See—*
Draper, David L., 4,695,090, Cl. 296-216.000.

Carswell, Joseph; and Ance, Louis, to BRIntec Corp. Cable hanger. 4,695,018, Cl. 248-74.200.

Carter, Charles A.: *See—*
Towner, Geoffrey F.; and Carter, Charles A., 4,694,910, Cl. 166-379.000.

Carter, George A., III; and Dooley, James L., to Photon Marketing Limited. Simulated shooting game with continuous transmission of target identification signals. 4,695,058, Cl. 273-311.000.

Carter, William S., to Xilinx, Inc. Bidirectional buffer amplifier. 4,695,740, Cl. 307-242.000.

Cartlidge, Jesse M., to Inductotherm Corporation. Multiple induction furnace system using single power supply. 4,695,316, Cl. 75-10.140.
Casco Products Corporation: *See*—
Lupoli, Peter J.; and Mattis, Donald J., 4,695,429, Cl. 422-49.000.
Casenhiser, Elaine J. Fingertip cover. 4,694,843, Cl. 132-73.000.
Casio Computer Co., Ltd.: *See*—
Shinohara, Isao; and Yoshimoto, Itsuro, 4,694,723, Cl. 84-1.030.
Yamamoto, Haruo, 4,695,828, Cl. 340-365.00S.
Caspar, Hans-Peter; and Schutz, Gunter, to Leybold-Heraeus GmbH. Turbomolecular vacuum pump with a rotor and at least one antifriction bearing. 4,695,223, Cl. 415-90.000.
Cassella Aktiengesellschaft: *See*—
Reh, Kuno; and Schophoff, Friedrich, 4,695,656, Cl. 568-587.000.
Cassels, Mark A. Sheet carrier. 4,695,085, Cl. 294-15.000.
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., to Lever Brothers Company. Cleaning compositions with skin protection agents. 4,695,395, Cl. 252-121.000.
Caterpillar Inc.: *See*—
Budzich, Tadeusz, 4,694,731, Cl. 91-421.000.
Grawey, Charles E.; and Winters, Scot L., 4,695,420, Cl. 264-265.000.
Vize, Robert M., 4,694,870, Cl. 141-326.000.
Caterpillar Industrial Inc.: *See*—
Barton, James C.; Hefner, Robert E.; Reid, Paul A.; and Sable, Frank R., 4,694,928, Cl. 180-268.000.
Cecconi, Arnold L.: *See*—
Spadaro, Peter R.; Smith, Jay E.; Speer, Elmer L.; and Cecconi, Arnold L., 4,695,299, Cl. 55-274.000.
Cemco, Inc.: *See*—
Lawrence, William A. P., 4,694,935, Cl. 187-111.000.
Centerchem, Inc.: *See*—
Wilder, Martin S., 4,695,456, Cl. 424-94.500.
Centre National de la Recherche Scientifique (C.N.R.S.): *See*—
Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, 4,695,432, Cl. 422-98.000.
Century Adhesives Corp.: *See*—
Friedlander, Randal H.; Nash, Sheryl A.; and Komitor, Greg A., 4,695,493, Cl. 428-40.000.
Cesarini, Jean F.: *See*—
Billet, Daniel; and Cesarini, Jean F., 4,695,787, Cl. 324-557.000.
Ceylan, Sukru , to O & K Orenstein & Koppel Aktiengesellschaft. Travelling hopper belt car. 4,694,948, Cl. 198-311.000.
CGR Ultrasonic: *See*—
Maerfeld, Charles, 4,694,700, Cl. 75-628.000.
Chaczyk, Adam W.: *See*—
Lichtenberg, Norman B.; and Chaczyk, Adam W., 4,694,706, Cl. 74-501.50R.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., to Advanced Magnetics Inc. Magnetic particles for use in separations. 4,695,392, Cl. 252-62.540.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., to Advanced Magnetics Inc. Magnetic particles for use in separations. 4,695,393, Cl. 252-62.540.
Chakrabarti, Kirti B.: *See*—
Wierzbicki, Julian J.; and Chakrabarti, Kirti B., 4,695,930, Cl. 362-293.000.
Chamberlain, John: *See*—
Zimmerman, Bernd; and Chamberlain, John, 4,695,128, Cl. 350-96.230.
Champion Spark Plug Company: *See*—
Podiak, Richard S., 4,695,759, Cl. 313-136.000.
Chandler, Van S.; and Arnstein, Robert A., to Concept Communications, Inc. Digital video compression system with variable digital filter. 4,695,883, Cl. 358-138.000.
Chang, Chin-Lung; and Feth, John R., to Litton Systems, Inc. Cutoff polarizer and method. 4,695,123, Cl. 350-96.150.
Chang, Kuo Y., to Dow Chemical Company, The. Preparation of trisphenol methanes. 4,695,408, Cl. 260-395.000.
Chang, Raymond S.: *See*—
Monaghan, Richard L.; Goetz, Michael A.; and Chang, Raymond S., 4,695,544, Cl. 435-119.000.
Chao, Sam T.: *See*—
Varma, Ravi K.; Chao, Sam T.; and Gordon, Eric M., 4,695,586, Cl. 514-469.000.
Chao, Tai-Hsiang; and Sachtler, J. W. A., to UOP Inc. Phosphorus-containing alumina catalyst for the isomerization of aromatics. 4,695,666, Cl. 585-481.000.
Chaplin, Gervaise M.: *See*—
Wyndham, Ronald; Chaplin, Gervaise M.; and Swanson, William M., 4,695,436, Cl. 423-135.000.
Chapman, Jon. Releasable connector. 4,694,544, Cl. 24-625.000.
Chapman, Norman V.: *See*—
Timmerman, Tom; and Chapman, Norman V., 4,694,785, Cl. 123-52.00A.
Chase, Thomas L.; and Long, Kenneth A., to RCA Corporation. Apparatus for securing a cathode-ray tube during processing. 4,695,045, Cl. 269-152.000.
Chatterjee, Pallab K., to Texas Instruments Incorporated. High density micropackage for IC chips. 4,695,872, Cl. 357-75.000.
Chautemps, Jacques: *See*—
Blanchard, Pierre; Descure, Pierrick; and Chautemps, Jacques, 4,695,860, Cl. 357-24.0LR.
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., to Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR. Hexapeptide. 4,695,622, Cl. 530-329.000.
Chedid, Louis: *See*—
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.
Cheeke, John D. N., to Universite de Sherbrooke. Acoustic microscopy. 4,694,699, Cl. 73-606.000.
Chemical Dynamics Development AB: *See*—
Andersson, Sven-Goran B., 4,695,659, Cl. 568-805.000.
Chen, I-Ting: *See*—
Chen, Sheng K.; Horng, Shi Y.; and Chen, I-Ting, 4,694,639, Cl. 56-10.200.
Chen, Sheng K.; Horng, Shi Y.; and Chen, I-Ting. Robotic lawn mower. 4,694,639, Cl. 56-10.200.
Cherill, Robert J.: *See*—
Kosley, Raymond W., Jr.; and Cherill, Robert J., 4,695,637, Cl. 546-207.000.
Cherne Industries, Inc.: *See*—
Hanson, Daniel R.; and Nesheim, Ludwig D., 4,695,258, Cl. 439-67.000.
Chester, Martin H., to Carmel Medical Devices. Endotracheal tube guide. 4,694,826, Cl. 128-303.00R.
Chevron Research Company: *See*—
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.
Buckley, Thomas F., 4,695,391, Cl. 252-51.50A.
Goodacre, John H.; and Brogren, Eric, 4,695,198, Cl. 405-224.000.
Goodacre, John H.; and Hall, Larry J., 4,695,199, Cl. 405-224.000.
Hall, Larry; and Goodacre, John H., 4,695,200, Cl. 405-224.000.
New, Richard, 4,695,192, Cl. 405-203.000.
New, Richard, 4,695,196, Cl. 405-224.000.
Plavac, Frank, 4,695,291, Cl. 44-62.000.
Sweeney, W. Alan, 4,695,401, Cl. 252-312.000.
Watt, Brian J.; Bhula, Dilipkumar N.; and Birdy, Jal N., 4,695,197, Cl. 405-224.000.
Chiba, Kimio: *See*—
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Chicopee: *See*—
Mays, Alfred T., 4,695,334, Cl. 156-62.200.
Chisso Corporation: *See*—
Goto, Yasuyuki; Ogawa, Tetsuya; and Sugimori, Shigeru, 4,695,398, Cl. 252-299.500.
Chito, Yasuo; and Ogawa, Masahiko, to Canon Kabushiki Kaisha. Rotation phase control device. 4,695,778, Cl. 318-314.000.
Cho, Yu H. Process for coloring granite. 4,695,487, Cl. 427-294.000.
Choiniere, Remi. Suction device. 4,694,529, Cl. 15-393.000.
Chou, Lung-Chiao. Disposable container. 4,694,986, Cl. 229-41.00R.
Choy, Clement K.; Keen, Frederick I.; Garabedian, Aram; and Spurgeon, Colleen J., to Clorox Company, The. Thickened aqueous cleanser. 4,695,394, Cl. 252-97.000.
Christe, Karl O., to Rockwell International Corporation. Method for the selective separation of gases. 4,695,296, Cl. 55-68.000.
Christensen, Burton G.: *See*—
Hannah, John; and Christensen, Burton G., 4,695,565, Cl. 514-206.000.
Christian, Donald J.; and Stachowicz, Michael J., to Texas Instruments Incorporated. Apparatus for automatically inspecting electrical connecting pins. 4,696,047, Cl. 382-8.000.
Christine, William, to Baxter Travenol Laboratories, Inc. Apparatus and method for attaching a fitment to a web of film. 4,695,337, Cl. 156-69.000.
Christini, Roy A.; and Frizzell, Kenneth P., to Aluminum Company of America. Magnesium refining process. 4,695,320, Cl. 75-67.00A.
Chronar Corporation: *See*—
Ramaprasad, K. R., 4,695,331, Cl. 437-126.000.
Chrysler Motors Corporation: *See*—
Hlavach, Mark C., 4,695,084, Cl. 293-126.000.
Maston, Donald M.; and Mertz, Kenneth H., 4,695,112, Cl. 439-350.000.
Chubb & Son's Lock and Safe Company Limited: *See*—
Bellingham, Ronald S.; and White, Malcolm J., 4,694,666, Cl. 70-16.000.
Chugai Denki Kogyo K.K.: *See*—
Shibata, Akira, 4,695,330, Cl. 148-6.300.
Chung, Alfred: *See*—
Ryan, James W.; and Chung, Alfred, 4,695,577, Cl. 514-362.000.
Ryan, James W.; and Chung, Alfred, 4,695,582, Cl. 514-423.000.
Chung-Bong-Chan, Alexander; and Wolfram, Leszek J., to Clairol Incorporated. Process for coloring keratinaceous materials. 4,695,285, Cl. 8-429.000.
Ciba-Geigy Corporation: *See*—
Bedekovic, Davor; and Fletcher, Ian J., 4,695,636, Cl. 546-116.000.
Cantatore, Giuseppe, 4,695,599, Cl. 524-103.000.
Lacroix, Roger; Adam, Jean-Marie; and Vincze, Janos, 4,695,406, Cl. 260-372.000.
Oertle, Konrad; and Wetter, Hansjurg, 4,695,643, Cl. 556-428.000.
Topfl, Rosemarie, 4,695,289, Cl. 8-573.000.
Ciemiega, Jan A. Exercise device. 4,695,049, Cl. 272-67.000.
Ciletti, Guy D.; and Trudeau, Michael J. Security box. 4,694,668, Cl. 70-63.000.
Cincinnati Milacron Inc.: *See*—
Gibbemeyer, Joseph F., 4,694,951, Cl. 198-468.300.

Monteith, Robert C.; and Borgmann, Robert E., 4,695,701, Cl. 219-121.0LV.

City of Columbus, Ohio, The: *See*—
Hawkins, Richard A.; and Hunter, Merle D., 4,694,757, Cl. 110-271.000.

Clairol Incorporated: *See*—
Chung-Bong-Chan, Alexander; and Wolfram, Leszek J., 4,695,285, Cl. 8-429.000.

Clark, Darrel E.: *See*—
Brown, Gregory D.; Clark, Darrel E.; and Schuermann, Rodger W., 4,694,692, Cl. 73-155.000.

Clark, Maynard H. Puppet apparatus. 4,695,265, Cl. 446-329.000.

Clasen, Rolf, to U.S. Philips Corporation. Method of for manufacturing glass bodies. 4,695,305, Cl. 65-18.300.

Clausen, Edvin L., to Norsk Hydro a.s. Heat exchanger element comprising a single and integrally extruded member including at least two hollow tubes integrally joined by at least two webs. 4,694,898, Cl. 165-171.000.

Clauss, Karl; Linkies, Adolf; and Reuschling, Dieter, to Hoechst Aktiengesellschaft. Process for the preparation of 6-methyl-3,4-dihydro-1,2,3-oxathiazin-4-one 2,2-dioxide and its non-toxic salts. 4,695,629, Cl. 544-2.000.

Cleary, Dennis: *See*—
Bimonte, Michael; and Cleary, Dennis, 4,694,972, Cl. 220-401.000.

Cleer, Clarence W., Jr. Multiple boiler heating system with improved venting and heat reclamation. 4,694,783, Cl. 122-448.00B.

Clements, Judson S.: *See*—
Mizuno, Akira; and Clements, Judson S., 4,695,358, Cl. 204-174.000.

Cline, Ronald L.: *See*—
Conner, George W.; Donald, Raymond G.; and Cline, Ronald L., 4,694,566, Cl. 437-48.000.

Clites, James L. Cutting torch holder. 4,695,041, Cl. 266-66.000.

Clorox Company, The: *See*—
Choy, Clement K.; Keen, Frederick I.; Garabedian, Aram; and Spurgeon, Colleen J., 4,695,394, Cl. 252-97.000.

Clossen, Kenneth. Bracket and repair method. 4,695,039, Cl. 254-134.30R.

Co-Ordinate Technology Ltd.: *See*—
Sandbach, Rex H.; and Poole, Alan, 4,694,776, Cl. 118-500.000.

Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., to Glaxo Group Limited. 1,2,3,9-tetrahydro-3-imidazol-1-ylmethyl-4H-carbazol-4-ones, composition containing them, and method of using them to treat neuronal 5HT function disturbances. 4,695,578, Cl. 514-397.000.

Cobb, Arthur L., Jr.: *See*—
Levine, Peter A.; Cobb, Arthur L., Jr.; Johnson, Cydney A.; and Peterson, Gary R., 4,695,878, Cl. 358-44.000.

Cobb, Raymond L., to Phillips Petroleum Company. Tetramethyltetrahydronaphthalene purification process. 4,695,671, Cl. 585-858.000.

Coburn, Joseph W., Jr. Phosphorescent material and process of manufacture. 4,695,336, Cl. 156-67.000.

Cody, Charles A.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.

Cohen, Fred, to Telesciences, Inc. Telephone traffic load control system. 4,696,029, Cl. 379-92.000.

Cohen, Theodore; and Matz, James, to University of Pittsburgh. Method of synthesizing brevicomin and using same in beetle control. 4,695,584, Cl. 514-456.000.

Cole, Charles J.: *See*—
Nagy, Monte L., Jr.; and Cole, Charles J., 4,695,497, Cl. 428-96.000.

Coleman, John R., to General Motors Corporation. Master cylinder with reservoir mounting arrangement. 4,694,652, Cl. 60-585.000.

Colgate-Palmolive Company: *See*—
Straw, Alan; and Shields, Stewart, 4,695,451, Cl. 424-47.000.

Colignon, Dietmar: *See*—
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.

Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, to Centre National de la Recherche Scientifique (C.N.R.S.); and Universite de Rennes I. Nitrides and oxynitrides which can be used as selective detectors of reducing gases in the atmosphere, and detection device containing them. 4,695,432, Cl. 422-98.000.

Collaborative Research, Inc.: *See*—
Botstein, David; Fink, Gerald R.; and Davis, Ronald W., 4,695,470, Cl. 426-37.000.

Collier, Ronald T.; and Thompson, Robert E., to Cardinal Industries, Inc. Apparatus for scoring and cutting wallboard and the like. 4,694,722, Cl. 83-885.000.

Collins, John. Apparatus for holding disposable bags. 4,695,020, Cl. 248-100.000.

Colorado Medical, Inc.: *See*—
Boag, James T., 4,695,385, Cl. 210-636.000.

Colsen, Ronnie H.: *See*—
Kairis, Alexandre; and Colsen, Ronnie H., 4,694,840, Cl. 128-735.000.

Columbia University in the City of New York, The Trustees of: *See*—
Cantor, Charles R.; and Schwartz, David C., 4,695,548, Cl. 435-179.000.

Colvell, William F.; and Baker, Dean M. Bearing extractor. 4,694,569, Cl. 29-724.000.

Comer, Robert C.; Hampel, Wilbur J.; and Rogers, Edward A., to Toro Company, The. Convertible vacuum-blower. 4,694,528, Cl. 15-330.000.

Commonwealth Scientific and Industrial Research Organisation: *See*—
Seddon, Duncan, 4,695,670, Cl. 585-533.000.

Compagnie Generale d'Electricite: *See*—
Belouet, Christian, 4,695,480, Cl. 437-225.000.

Compton, Diana R.: *See*—
Fulkerson, Emmet M.; Somers, Ralph M.; and Compton, Diana R., 4,695,721, Cl. 250-234.000.

Compton, Russell A.: *See*—
Kramer, David M.; Compton, Russell A.; Strenk, Lawrence M.; and Murdoch, James B., 4,695,800, Cl. 324-309.000.

Concept Communications, Inc.: *See*—
Chandler, Van S.; and Arnstein, Robert A., 4,695,883, Cl. 358-138.000.

Conley, John L. Sheet gripping assembly. 4,694,543, Cl. 24-461.000.

Conner, George W.; Donald, Raymond G.; and Cline, Ronald L., to Signetics Corporation. Method for manufacturing programmable read-only memory containing cells formed with opposing diodes. 4,694,566, Cl. 437-48.000.

Conrad, Neal D.: *See*—
McClelland, Sandra K.; Conrad, Neal D.; and Desai, Nitin V., 4,695,490, Cl. 428-1.000.

Conradty GmbH & Co. Metallelektroden KG: *See*—
Koziol, Konrad, 4,695,355, Cl. 204-252.000.

Continental Gummi-Werke Aktiengesellschaft: *See*—
Gerloff, Klaus; Ehlert, Dieter; and von der Wall, Klaus, 4,694,873, Cl. 152-380.000.

Continental Molding Corporation: *See*—
MacDonald, John B.; and McLinn, David E., 4,695,103, Cl. 312-18.000.

Convey Teknik AB: *See*—
Forslund, Alf; and Andersson, Goran, 4,695,414, Cl. 264-3.100.

Cook, John S., to Dorran Photonics, Incorporated. Method and apparatus for effecting light energy transmission with lessened reflection. 4,695,126, Cl. 350-96.210.

Cooper Industries, Inc.: *See*—
Ohlhaber, Ronald L.; and Ulijasz, Thaddeus R., 4,695,127, Cl. 350-96.230.

Cooper, Lorne: *See*—
Sullivan, Roderick B., II; Doshi, Mahesh; and Cooper, Lorne, 4,695,968, Cl. 364-578.000.

Corbett, Clifford F.: *See*—
Butler, David R.; and Corbett, Clifford F., 4,694,884, Cl. 164-359.000.

Corcom, Inc.: *See*—
Talend, Donald R., 4,695,115, Cl. 439-76.000.

Cordova, Colleen W.; and Rowan, Hugh H., to Allied Corporation. Polyamide fiber reinforcement in thermoset polyurethane composites. 4,695,509, Cl. 428-267.000.

Cornelson, Donald P.; and Carlson, Jess W., to C & C Concepts, Inc. Variable surface board game. 4,695,056, Cl. 273-262.000.

Corr, James J.: *See*—
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.

Costes, Michel L.: *See*—
Montanari, Gerard M.; Baudelot, Francis E.; and Costes, Michel L., 4,695,997, Cl. 370-13.000.

Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., to Sloan-Kettering Institute for Cancer Research. Human monoclonal antibodies to cell surface antigens. 4,695,538, Cl. 435-7.000.

Cothery, Jeffrey R., to Reid Manufacturing Co., Inc. Tool for removing windshield sealant. 4,694,576, Cl. 30-280.000.

Cousin, Stephane; and Boumendil, Jean-Paul, to Isover Saint-Gobain. Insulating and impervious roofing panels and a process and apparatus for their manufacture. 4,695,338, Cl. 156-71.000.

Coville, William E.; Grossman, Hyman; and Sokol, Michael, to Bio/-Data Corporation. Analytical apparatus. 4,695,430, Cl. 422-65.000.

Covington, Edward J.; Cridland, John E.; and Gorman, John P., to General Electric Company. Bimetal switch for electrode heat cutout within an electrically insulating support. 4,695,768, Cl. 315-73.000.

Craig, John A. Internal combustion engine rocker arm. 4,694,788, Cl. 123-90.160.

Craig Medical Products Limited: *See*—
Steer, Graham E., 4,695,279, Cl. 604-397.000.

Crane, Roger M.; and Macander, Aleksander B., to United States of America, Navy. Resin impregnation and processing technique for rigidizing net-shaped fibrous skeletal composite preforms. 4,695,344, Cl. 156-242.000.

Cridland, John E.: *See*—
Covington, Edward J.; Cridland, John E.; and Gorman, John P., 4,695,768, Cl. 315-73.000.

Cronin, James J., to Microgon, Inc. Combined fluid filter and delivery tubing. 4,695,382, Cl. 210-436.000.

Crooks, Lawrence E.: *See*—
Arakawa, Mitsuaki; Fehn, John H.; and Crooks, Lawrence E., 4,695,801, Cl. 324-318.000.

Crosby, Jane M.; and Hutchins, MaryGail K., to LNP Corporation. Fiber reinforced thermoplastics containing silicone interpenetrating polymer networks. 4,695,602, Cl. 524-439.000.

Crosby, Michael A.; and Foss, Art J., to Mattel, Inc. Toy rotating gear accessory for use with gyroscopic top. 4,695,262, Cl. 446-236.000.

Crossett, Edward H. Convertible sofa mechanism. 4,694,514, Cl. 5-12.00R.

Crossley, David W.: *See—*
Simmel, Thomas L.; Crossley, David W.; and Morehouse, Mark N., 4,695,267, Cl. 446-462.000.

Crotti, Aldo, to Societa' Italtractor Meccanica Itm S.p.A. Lubricated roller for the tracks of crawler vehicles, in particular, a top roller with fixed overhung shaft and rolling bearings. 4,695,102, Cl. 305-11.000.

Cruz-Uribe, Antonio S., to Pitney Bowes Inc. External manifold for ink jet array. 4,695,854, Cl. 346-140.00R.

Cselt - Centro Studi e Laboratori Telecommunicazioni S.p.A.: *See—*
Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, 4,696,001, Cl. 370-88.000.

Cuffiani, Illaro: *See—*
Albizzati, Enrico; Pettenati, Enrico; Zucchini, Umberto; and Cuffiani, Illaro, 4,695,558, Cl. 502-123.000.

Cullmann Handelsgesellschaft fur Verbrauchsgutter mbH: *See—*
Leinfelder, Klaus, 4,695,021, Cl. 248-168.000.

Cummings, Susan G.: *See—*
Barnes, Andrew C.; and Cummings, Susan G., 4,695,455, Cl. 424-93.000.
Barnes, Andrew C.; and Cummings, Susan G., 4,695,462, Cl. 424-195.100.

Cummins Engine Company, Inc.: *See—*
Mathews, Will W., 4,694,551, Cl. 29-402.080.

Cuneo, Carol A.; and Lambert, Charles, to General Foods Corporation. Dry, sugar-free instant pudding mix. 4,695,474, Cl. 426-579.000.

Cunningham, Robert A., to Hughes Tool Company - USA. Drill pipe inside blowout preventer. 4,694,855, Cl. 137-519.500.

Cuperus, Rinze: *See—*
Bos, Jacobus J.; Cuperus, Rinze; and Wielinga, Rudolf, 4,695,628, Cl. 540-312.000.

Curl, Ricky L.: *See—*
Johnson, Terry W.; Harms, Daryl E.; and Curl, Ricky L., 4,695,880, Cl. 358-86.000.

Curro, John J.; Trusty, Alan J.; and Vernon, George M., to Procter & Gamble Company, The. Production of formed material by solid-state formation with a high-pressure liquid stream. 4,695,422, Cl. 264-504.000.

Custode, Frank Z., to Rockwell International Corporation. Method of making hardened CMOS sub-micron field effect transistors. 4,694,565, Cl. 437-34.000.

Custom Machinery Design, Inc.: *See—*
Gietman, Peter J., Jr., 4,695,005, Cl. 242-56.00R.

Daalmans, Gabriel M., to Siemens Aktiengesellschaft. Method for making a superconducting gradiometer having a three-dimensional structure and associated connecting lines for a device for measuring weak magnetic fields. 4,694,567, Cl. 29-599.000.

Dabich, Kathyleen A. Pit cover assembly with flood protection. 4,694,619, Cl. 52-20.000.

Dabisch, Wolfgang: *See—*
Dabisch, Wolfgang H.; Kung, Peter; Muller, Siegfried R.; and Narayanan, Krishnamoorthy, 4,695,528, Cl. 430-290.000.

Dabisch, Wolfgang H.; Kung, Peter; Muller, Siegfried R.; and Narayanan, Krishnamoorthy, to Dabisch, Wolfgang. Process for forming images using body with reversible fixable and temperature-variable light extinctions. 4,695,528, Cl. 430-290.000.

Dabrowski, Henry. Reeling mandrel for winding metal strips. 4,695,008, Cl. 242-68.500.

Dadpey, Habib: *See—*
Shero, David J.; and Dadpey, Habib, 4,695,783, Cl. 318-808.000.

Dai-Ichi Kogyo Seiyaku Co., Ltd.: *See—*
Tanaka, Teruo; Tanaka, Teruya; and Kitamura, Masato, 4,695,484, Cl. 427-245.000.

Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, 4,694,749, Cl. 101-426.000.

Daido Tokushuko Kabushiki Kaisha: *See—*
Iriyama, Shozo; and Abe, Mitsuo, 4,694,508, Cl. 2-21.000.

Daiichi Denshi Kogyo Kabushiki Kaisha: *See—*
Ohtsuki, Tomonari; and Tsurumaki, Kazuyoshi, 4,695,914, Cl. 361-42.000.

Daikin Industries, Ltd.: *See—*
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,695,488, Cl. 427-385.500.
Kodama, Masahiro; Sakae, Tatsuya; and Urano, Yoshio, 4,695,967, Cl. 364-521.000.

Daimler-Benz Aktiengesellschaft: *See—*
Faust, Eberhard; Niethammer, Kurt; and Hammer, Ludwig, 4,695,095, Cl. 297-410.000.
Siebler, Helmut, 4,695,094, Cl. 297-331.000.

Dainichi-Nippon Cables, Ltd.: *See—*
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.

Dainippon Screen Mfg. Co., Ltd.: *See—*
Nishihama, Takamichi; Okada, Kotaro; and Kadota, Shigekazu, 4,695,044, Cl. 269-21.000.

Daintrey, Joseph W.; and Thomson, Peter, to Sankey Vending Limited. Apparatus for beverage brewing. 4,694,739, Cl. 99-289.00R.

D'Aleo, Michael J.; and Smaich, Mark, to Lutron Electronics Co. Inc. Safety device for apparatus having relatively movable members. 4,695,820, Cl. 338-179.000.

Daloz, Joanny, to SEB S.A. Domestic appliance using a hydrophilic powder. 4,694,740, Cl. 99-323.300.

Dana Corporation: *See—*
Pearch, Dean A.; and Pung, Thomas F., 4,694,946, Cl. 192-85.0AA.

Darden, Nick: *See—*
Goodale, David L.; and Darden, Nick, 4,694,861, Cl. 137-624.190.

Darilek, Glenn T., to Mobil Oil Corporation. Remote switch position determination using duty cycle modulation. 4,695,840, Cl. 340-825.054.

Data Card Corporation: *See—*
Nubson, Richard C., 4,695,850, Cl. 346-76.0PH.

Data General Corporation: *See—*
Latham, Paul W., II, 4,695,747, Cl. 307-317.00R.

Davis, Ronald W.: *See—*
Botstein, David; Fink, Gerald R.; and Davis, Ronald W., 4,695,470, Cl. 426-37.000.

Dawson, John, to General Electric Company. Actuator for variable vanes. 4,695,220, Cl. 415-9.000.

Dayco Products, Inc.: *See—*
Tassone, Joseph V.; and Candor, James T., 4,695,269, Cl. 474-268.000.

De La Plaza, Alejandro, to SGS Microelettronica S.p.A. Sampling-data integrator with commutated capacitance utilizing a unitary-gain amplifier. 4,695,751, Cl. 307-490.000.

De La Plaza, Alejandro: *See—*
Torelli, Guido; and De La Plaza, Alejandro, 4,696,035, Cl. 381-1.000.

Dean, Raymond H.: *See—*
Carlson, Melvin C.; and Dean, Raymond H., 4,694,988, Cl. 236-49.000.
Carlson, Melvin C.; and Dean, Raymond H., 4,694,989, Cl. 236-49.000.

Dean, Robert A.: *See—*
Woodard, Kenneth E., Jr.; Dean, Robert A.; Fair, David L.; and Fister, Julius C., Jr., 4,695,359, Cl. 204-255.000.

Deeg, Rolf: *See—*
Schmitt, Urban; Deeg, Rolf; and Ziegenhorn, Joachim, 4,695,552, Cl. 436-66.000.

Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, to Mitsui Engineering & Shipbuilding Co., Ltd. Method for production of lanthanide-containing alloy. 4,695,427, Cl. 420-129.000.

De Graff, Richard R., to UOP Inc. Process for alkylation of hydrocarbons. 4,695,665, Cl. 585-450.000.

DeGrazia, Torey W., Jr. Fuel injection apparatus for automobile. 4,694,804, Cl. 123-462.000.

Degussa Aktiengesellschaft: *See—*
Jansen, Martin; and Standke, Burkhard, 4,695,353, Cl. 204-96.000.

Dehennau, Claude; and Vandendael, Yannick, to Solvay & Cie. (Societe Anonyme). Rigid and semirigid thermoplastic structures with multiple coextruded polymeric layers incorporating an inner vinylidene chloride copolymer layer and use of these structures for the manufacture of packages. 4,695,506, Cl. 428-212.000.

Dei, Katsuhito, to Canon Kabushiki Kaisha. Recording apparatus. 4,695,849, Cl. 346-76.00L.

Deissenberger, Hans: *See—*
Dreher, Anton; and Gramer, Josef, 4,695,001, Cl. 242-25.00R.

Deitz, Victor R. Chemically impregnated in situ regeneration of the efficiency of activated carbon filters for trapping radioactive iodine. 4,695,561, Cl. 502-401.000.

Dekura, Yoshinori: *See—*
Momata, Kazuhiro; Dekura, Yoshinori; Honzawa, Tadashi; and Matsushige, Hiromi, 4,695,909, Cl. 360-122.000.

Delfino, Gerolamo; Franco, Simone; and Verdi, Cesare, to Minnesota Mining and Manufacturing Company. Light-sensitive elements for radiographic use in the formation of an X-ray image. 4,695,531, Cl. 430-513.000.

Del Signore, Leonello: *See—*
Caporossi, Adolfo; and Del Signore, Leonello, 4,695,616, Cl. 526-202.000.

Delta International Machinery Corp.: *See—*
Brickner, Louis C., Jr.; and Skipworth, Jerry D., 4,694,720, Cl. 83-471.300.
Brickner, Louis C., Jr., 4,694,721, Cl. 83-471.300.

Dempster Systems, Inc.: *See—*
Sutton, Gary, 4,694,858, Cl. 137-596.000.

Den Exter Blokland, Hendrikus B.; and van Raay, Petrus J., to U.S. Philips Corp. Information display panel. 4,695,135, Cl. 350-452.000.

Denkoh Co. Ltd.: *See—*
Mizushina, Youichi, 4,695,706, Cl. 219-390.000.

DeNuccio, Ron J.; Kim, Han J.; and Leung, Chi H., to GTE Products Corporation. Bimetal thermostats and method of manufacture. 4,694,558, Cl. 29-527.200.

Dernis, David. Attachment of rings without sewing. 4,694,545, Cl. 29-1.00R.

Derouane, E. G.; Dessau, R. M.; Heilweil, I. J.; and Kerr, G. T., to Mobil Oil Corporation. Method for preparing crystalline zirconium phosphates. 4,695,642, Cl. 556-14.000.

Derrico, Gerard G., to Dynapert-HTC Corporation. Vapor phase processing machine. 4,694,775, Cl. 118-64.000.

Desai, Harshad K.: *See—*
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.

Desai, Jagdish A.: *See—*
Rane, Dinanath F.; Desai, Jagdish A.; and Pike, Russell E., 4,695,579, Cl. 514-397.000.
Desai, Nitin V.: *See—*
McClelland, Sandra K.; Conrad, Neal D.; and Desai, Nitin V., 4,695,490, Cl. 428-1.000.
DeSantis, Charles M.: *See—*
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.
Desbois, Michel, to Rhone-Poulenc Specialites Chimiques. Process for preparing compounds containing a difluoromethylene group in a position α to an oxygen atom. 4,695,657, Cl. 568-656.000.
Des Brisay, George S., Jr., to Hughes Aircraft Company. Multiple input disaymmetric latch. 4,695,743, Cl. 307-272.200.
Descure, Pierrick: *See—*
Blanchard, Pierre; Descure, Pierrick; and Chautemps, Jacques, 4,695,860, Cl. 357-24.0LR.
Desport, Lucien A., to Engineering Management Data Processing (E.M.D.P.). Convertible mould. 4,695,032, Cl. 249-112.000.
Dessau, R. M.: *See—*
Derouane, E. G.; Dessau, R. M.; Heilweil, I. J.; and Kerr, G. T., 4,695,642, Cl. 556-14.000.
Detox International Corporation: *See—*
Shultz, Clifford G., 4,695,447, Cl. 423-659.000.
Deutsch, Volker K.; and Roddeck, Werner F., to Karl Deutsch Prüf- und Messgerätebau GmbH+Co. KG. Method of and apparatus for layer thickness measurement. 4,695,797, Cl. 324-230.000.
Development Finance Corporation: *See—*
Wondergem, Anthony L., 4,695,101, Cl. 303-117.000.
Dhyanchand, P. John: *See—*
Dishner, Bryan W.; Juarros, Richard D.; and Dhyanchand, P. John, 4,695,776, Cl. 318-14.000.
Nguyen, Vietson M.; Dhyanchand, P. John; and Thollot, Pierre, 4,695,933, Cl. 363-17.000.
Dial, Larry A.: *See—*
Beining, August H.; Dial, Larry A.; Smith, William A.; and Rieck, Gene W., 4,695,827, Cl. 340-365.00P.
Dianalog Systems, Inc.: *See—*
Zarate, Humberto T., 4,694,890, Cl. 165-12.000.
Dick, Franklin A., to Marbetech Corporation. Apparatus and methods for determining the wettability of various substrates. 4,694,685, Cl. 73-104.000.
Dicke, Grant D.; and Williams, Jeffrey A., to Dicke Tool Company. Portable collapsible highway sign. 4,694,601, Cl. 40-610.000.
Dicke Tool Company: *See—*
Dicke, Grant D.; and Williams, Jeffrey A., 4,694,601, Cl. 40-610.000.
Dickinson, Alan J., to British Gas Corporation. Pipe scraper. 4,694,574, Cl. 30-94.000.
Didier Engineering GmbH: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.
Didier-Werke AG: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.
Winkelmann, Manfred; Rothfuss, Hans; Muschner, Udo; and Schmitt, Karl H., 4,695,043, Cl. 266-265.000.
Diehl, Konrad, to Pfaff Industriemaschinen GmbH. Adjustable apparatus for sewing machine thread tensioning device. 4,694,765, Cl. 112-254.000.
Diels, Gaston S. M.: *See—*
Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,695,575, Cl. 514-322.000.
Dietl, Joachim: *See—*
Annacker, Ralph; and Dietl, Joachim, 4,695,807, Cl. 330-310.000.
Digital Equipment Corporation: *See—*
Mallary, Michael L., 4,695,351, Cl. 204-15.000.
Di Lena, Francesco: *See—*
Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, 4,695,193, Cl. 405-204.000.
Dill, James M., to EOL_3 Company, Inc. Protective light filter system for image intensifier. 4,695,718, Cl. 250-213.0VT.
Dines, Jack E.; and Gillingham, Ernest L., to Jet Research Inc. Multiphase charge holder. 4,694,754, Cl. 102-310.000.
DiOrazio, Joseph S.: *See—*
Grabbe, Dimitry; Korsunsky, Iosif; Klunk, Thomas M.; and DiOrazio, Joseph S., 4,695,111, Cl. 439-266.000.
Director-General of the Agency of Industrial Science & Technology: *See—*
Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, 4,695,247, Cl. 431-352.000.
Dishner, Bryan W.; Juarros, Richard D.; and Dhyanchand, P. John, to Sunstrand Corporation. Power converter for an electrically-compensated constant speed drive. 4,695,776, Cl. 318-14.000.
DiValentin, Eugene D.: *See—*
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., 4,695,736, Cl. 290-44.000.
DNAX Research Institute of Molecular and Cellular Biology, Inc.: *See—*
Yokota, Takashi; Lee, Frank; Rennick, Donna; and Arai, Ken-ichi, 4,695,542, Cl. 435-68.000.
Dobrovolny, Mark S.: *See—*
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.
Doddington, George R.; and Secrest, Bruce G., to Texas Instruments Incorporated. Voice messaging system with unified pitch and voice tracking. 4,696,038, Cl. 381-38.000.
Doddington, George R., to Texas Instruments Incorporated. Speech analysis/synthesis system with silence suppression. 4,696,039, Cl. 381-46.000.
Doddington, George R.; and Papamichalis, Panos E., to Texas Instruments Incorporated. Speech analysis/synthesis system with energy normalization and silence suppression. 4,696,040, Cl. 381-46.000.
Doi, Yoshiharu: *See—*
Suzuki, Shigeo; Doi, Yoshiharu; and Soga, Kazuo, 4,695,557, Cl. 502-103.000.
Dollfus-Meig & Cie: *See—*
Saingier, Jean; and Joly, Jean-Pierre A., 4,695,641, Cl. 549-552.000.
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., to United Technologies Corporation. Variable speed wind turbine. 4,695,736, Cl. 290-44.000.
Domtar Inc.: *See—*
Janssen, Wladmir, 4,694,683, Cl. 73-63.000.
Donald, Raymond G.: *See—*
Conner, George W.; Donald, Raymond G.; and Cline, Ronald L., 4,694,566, Cl. 437-48.000.
Donuma, Kenichi: *See—*
Takezawa, Hatsuo; Donuma, Kenichi; Katagiri, Shuhei; and Sakura, Shigeyuki, 4,695,858, Cl. 357-19.000.
Dooley, James L.: *See—*
Carter, George A., III; and Dooley, James L., 4,695,058, Cl. 273-311.000.
Dorling, Rolf: *See—*
Premel, Ulrich; Dorling, Rolf; and Schultze, Manfred, 4,694,782, Cl. 122-7.00R.
Dorman, Linneaus C.; Meyer, Victor E.; and Wu, Marinda L., to Dow Chemical Company, The. Gas separation membranes from polymers containing a hydrocarbon backbone and pendant (hydrocarbylamido)alkyl ester moieties. 4,695,295, Cl. 55-16.000.
Dorran Photonics, Incorporated: *See—*
Cook, John S., 4,695,126, Cl. 350-96.210.
Dorsett, Preston H., to University of Tennessee Research Corp., The. Particles sensitized with detergent-treated antigen for agglutination immunoassay. 4,695,537, Cl. 435-5.000.
Doryokuro Kakunenryo Kaihatsu Jigyodan: *See—*
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, 4,695,730, Cl. 250-370.000.
Doshi, Mahesh: *See—*
Sullivan, Roderick B., II; Doshi, Mahesh; and Cooper, Lorne, 4,695,968, Cl. 364-578.000.
Doss, Hubert M. Well string section spinning tool. 4,694,712, Cl. 81-57.170.
Dotter, Fritz: *See—*
Volk, Heinrich; Harter, Karl; and Dotter, Fritz, 4,694,745, Cl. 101-111.000.
Doughman, Donald J.: *See—*
Lindstrom, Richard L.; Doughman, Donald J.; and Skelnik, Debra, 4,695,536, Cl. 435-1.000.
Dovan, Hoai T.: *See—*
Hutchins, Richard D.; and Dovan, Hoai T., 4,694,906, Cl. 166-294.000.
Dover, Jerome J., to Basic American Foods. Deep fat fryer. 4,694,742, Cl. 99-404.000.
Dow Chemical Company, The: *See—*
Alderman, Daniel A., 4,695,464, Cl. 424-449.000.
Allada, Sambasiva R., 4,695,621, Cl. 528-483.000.
Boussert, Anne S., 4,695,357, Cl. 204-157.410.
Busk, Robert S., 4,694,881, Cl. 164-113.000.
Busk, Robert S., 4,694,882, Cl. 164-113.000.
Chang, Kuo Y., 4,695,408, Cl. 260-395.000.
Dorman, Linneaus C.; Meyer, Victor E.; and Wu, Marinda L., 4,695,295, Cl. 55-16.000.
Stevens, James C.; and Fordyce, William A., 4,695,669, Cl. 585-511.000.
Dow Corning Corporation: *See—*
Spells, Sherwood; Warren, James R.; and Wieck, Ronald W., 4,695,185, Cl. 404-107.000.
Dowell Schlumberger Incorporated: *See—*
Kubala, Gregory, 4,695,389, Cl. 252-8.553.
Downes, Richard T.: *See—*
Nohren, John E., Jr.; and Downes, Richard T., 4,695,379, Cl. 210-282.000.
Downham, David, to Leslie Hartridge Limited. Press incorporating saftey system. 4,694,671, Cl. 72-26.000.
Doyen, Gerard, to Alsthom. Hinge and sectional panels on a frame enabling assembly and disassembly thereof. 4,694,533, Cl. 16-257.000.
Dragerwerk AG: *See—*
Slemmer, Janos; and Schroter, Gottfried, 4,694,825, Cl. 128-205.240.
Draper, David L., to Cars & Concepts, Inc. Externally retractable sunroof assembly. 4,695,090, Cl. 296-216.000.

Dreckmann, Karl; Schneider, Jakob; and Theuner, Hans-Werner, to Lemo M. Lehmacher & Sohn GmbH Maschinenfabrik. Apparatus for applying transverse weld seams to an intermittently moved plastic foil web. 4,695,346, Cl. 156-361.000.

Dreher, Anton; and Gramer, Josef, to Deissenberger, Hans. Means for cutting to length and winding winding material. 4,695,001, Cl. 242-25.00R.

Dreschmann, Peter; and Walter, Wilhelm, to FAG Kugelfischer Georg Schafer (KGaA). Pressure relieving sealing rings for rotating elements. 4,695,062, Cl. 277-27.000.

Dreyer, Heinz; Scheufler, Bernd; Wiemeyer, Benno; and Luhrmann, Johannes, to Amazonen Werke H. Dreyer GmbH & Co. KG. Seed drill. 4,694,759, Cl. 111-85.000.

Dries, Hubertus W. A. A., to Shell Oil Company. Apparatus for cleaning solids-laden gas. 4,695,298, Cl. 55-223.000.

Drug Science Foundation: *See—*
Eller, Thomas D.; Halushka, Perry V.; Knapp, Daniel R.; and Mais, Dale, 4,695,647, Cl. 560-53.000.

DSM Rim Nylon V.O.F.: *See—*
Mottus, Edward H.; and Hedrick, Ross M., 4,695,611, Cl. 525-432.000.

DSO "Elprom": *See—*
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.

Dublet, Guy P.: *See—*
Palicot, Jacques P.; and Dublet, Guy P., 4,696,015, Cl. 375-14.000.

DuBois, Dale R.: *See—*
Learn, Arthur J.; and DuBois, Dale R., 4,694,778, Cl. 118-728.000.

Ducharme, Gerald L., to Eastman Kodak Company. Subbing layer for dye-donor element used in thermal dye transfer. 4,695,288, Cl. 8-471.000.

Duke University: *See—*
Wijayarthna, Bandula; and Newman, Glenn E., 4,694,838, Cl. 128-658.000.

Dunbar, Donn D., to Inside Outfitters, Inc. Manually operated shade lowering and raising mechanism for atrium walls. 4,694,877, Cl. 160-273.00R.

Duncombe, Richard R.: *See—*
Sikich, Joseph P.; and Duncombe, Richard R., 4,695,981, Cl. 365-227.000.

Dundarov, Pantcho G.: *See—*
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.

Dunn, Joseph E.; and Pearlman, Jay S., to Maxwell Laboratories, Inc. Methods and apparatus for extending the shelf life of fluid food products. 4,695,472, Cl. 426-237.000.

Dunn, Patrick J.: *See—*
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.

Du Pont de Nemours, E. I., and Company: *See—*
Rorer, Morris P., 4,695,310, Cl. 71-90.000.
Rorer, Morris P., 4,695,311, Cl. 71-92.000.
Spinelli, Harry J., 4,695,607, Cl. 525-272.000.

Dutkewych, Oleh B., to Shipley Company Inc. Ductile electroless copper. 4,695,505, Cl. 428-209.000.

Dyckerhoff & Widmann Aktiengesellschaft: *See—*
Herrmann, Gero, 4,694,623, Cl. 52-223.00L.

Dyer, John; and Kennette, John W., to Johnson & Johnson Products, Inc. Stabilized fabric. 4,695,500, Cl. 428-134.000.

Dykes, Charles D.: *See—*
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.

Dynaflair Corporation Canada Inc.: *See—*
Schwalb, Horst, 4,694,669, Cl. 70-100.000.

Dynapert-HTC Corporation: *See—*
Derrico, Gerard G., 4,694,775, Cl. 118-64.000.

Dynes, Paul J.: *See—*
Hamermesh, Charles L.; Dynes, Paul J.; and Hogenson, Peter A., 4,695,619, Cl. 528-73.000.

Dytel Corporation: *See—*
Morganstein, Sanford J.; Tuck, Edward F.; Mehta, Bakulesh A.; and Krakau, Herbert B., 4,696,028, Cl. 379-88.000.

Dzhalabadze, Nikolai V.: *See—*
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.

Dzhikia, Alexandr A.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

E.G.O. Elektro-Gerate Blanc u. Fischer: *See—*
Essig, Willi; and Petri, Heinz, 4,695,816, Cl. 337-394.000.
Schreder, Felix, 4,695,708, Cl. 219-486.000.

E. R. Squibb & Sons, Inc.: *See—*
Varma, Ravi K.; and Gordon, Eric M., 4,695,585, Cl. 514-469.000.
Varma, Ravi K.; Chao, Sam T.; and Gordon, Eric M., 4,695,586, Cl. 514-469.000.

E-Systems, Inc.: *See—*
Masheff, Michael S.; and Sanders, David E., 4,696,017, Cl. 375-60.000.

Eagle, Paul A.: *See—*
Maddux, Forrest E., Jr.; Eagle, Paul A.; and Robbins, Robert L., 4,694,638, Cl. 53-459.000.

Eagle-Picher Industries, Inc.: *See—*
Meisner, Edward O.; and Romine, Charles F., 4,695,061, Cl. 277-27.000.

Eastman Christensen Co.: *See—*
Heidemann, Gerhard; and Witte, Johannes, 4,694,917, Cl. 175-299.000.

Eastman, George Y., to Thermacore, Inc. Thermally stabilized laser cavity. 4,696,010, Cl. 372-34.000.

Eastman Kodak Company: *See—*
Bishop, John F., 4,695,526, Cl. 430-215.000.
Bryan, Philip S.; and Herz, Arthur H., 4,695,534, Cl. 430-569.000.
Bryan, Philip S.; and Herz, Arthur H., 4,695,535, Cl. 430-569.000.
Ducharme, Gerald L., 4,695,288, Cl. 8-471.000.
Evans, Steven; and Lum, Kin K., 4,695,287, Cl. 8-471.000.
Kissel, Thomas R., 4,695,362, Cl. 204-419.000.
Minor, James C., 4,695,723, Cl. 250-325.000.
Peterson, Dean M., 4,695,887, Cl. 358-213.130.
Peterson, Dean M., 4,695,888, Cl. 358-213.130.
Peterson, Dean M., 4,695,891, Cl. 358-213.130.
Ponticello, Ignazio S.; and Otocka, Edward P., 4,695,532, Cl. 430-533.000.
Sasson, Steven J., 4,695,874, Cl. 358-21.00R.
Thibault, Jean, 4,695,147, Cl. 354-322.000.
Vanier, Noel R.; and Lum, Kin K., 4,695,286, Cl. 8-471.000.
Wolcott, Dana W., 4,695,902, Cl. 358-332.000.

Ebeling, Wilfried: *See—*
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.

Eberhart, Edward; and Ingram, Arlen E., to Ingram, Arlen E. Sanding tool. 4,694,618, Cl. 51-392.000.

Ebinuma, Ryuichi: *See—*
Ichihashi, Hiroo; Ozawa, Masakazu; Ebinuma, Ryuichi; and Saito, Atsushi, 4,695,855, Cl. 346-145.000.

ECI Building Components, Inc.: *See—*
Vondergoltz, G. Earl; and Hammack, Milton E., 4,694,628, Cl. 52-528.000.

Ecker, Howard J.: *See—*
Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., 4,694,552, Cl. 29-418.000.

Ecker Mfg. Corp.: *See—*
Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., 4,694,552, Cl. 29-418.000.

Ecker, Robert S.: *See—*
Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., 4,694,552, Cl. 29-418.000.

Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., to Ecker Mfg. Corp.; and Product Design & Development, Inc. Method for fabricating a compound portal frame extrusion profile. 4,694,552, Cl. 29-418.000.

Eckhaus, Ira. Electrical wire connectors for wire of varied sizes. 4,695,113, Cl. 439-404.000.

Ecole Nationale Superieure de Creation Industrielle: *See—*
Sibertin-Blanc, Jean-Baptiste; and Tellier, Yves, 4,694,931, Cl. 182-3.000.

Ecole Polytechnique: *See—*
Roy, Gilles, 4,695,792, Cl. 324-83.00D.

Edelstein, William A.: *See—*
Hardy, Christopher J.; and Edelstein, William A., 4,695,799, Cl. 324-307.000.

Edwardson, Svante R., to AB Dentatus. Quick mount face-bow device for an articulator. 4,695,252, Cl. 433-73.000.

Egawa, Mitsuo: *See—*
Ninomiya, Kunihiro; Nitta, Issei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, 4,695,568, Cl. 514-258.000.

Egli, Annmarie O.; and St. Clair, Terry L., to United States of America, National Aeronautics and Space Administration. Semi-2-interpenetrating networks of high temperature systems. 4,695,610, Cl. 525-426.000.

Egli, Werner H., to Honeywell Inc. Error cancelling bias system. 4,695,160, Cl. 356-350.000.

Egozi, Avihay, to Elscint Ltd. Patient operator intercom arrangements for magnetic resonance imaging systems. 4,696,030, Cl. 379-167.000.

Ehle, Joachim; Fuchs, Gerhard; Kimmer, Klaus; and Langfeldt, Horst-Rudiger, to Fuchs Systemtechnik GmbH. Vessel of a metallurgical furnace, especially of an arc furnace. 4,696,013, Cl. 373-71.000.

Ehlert, Dieter: *See—*
Gerloff, Klaus; Ehlert, Dieter; and von der Wall, Klaus, 4,694,873, Cl. 152-380.000.

Ehrfeld, Wolfgang; and Hagmann, Peter, to Kernforschungszentrum Karlsruhe GmbH. Method for producing a spinning nozzle plate. 4,694,548, Cl. 29-157.00C.

Ehrhardt, Winfried; Richter, Klaus; and Lehr, Adolf, to Carr Lane Roemheld Manufacturing Co., Inc. T-slot hydraulic clamp system. 4,695,047, Cl. 269-309.000.

Eichenbaum, Daniel M. Laser system for intraocular tissue removal. 4,694,828, Cl. 128-303.100.

Eichweber, Kurt, to Precitronic Gesellschaft. Method for practicing aiming with the use of a laser firing simulator and of a retroreflector on the target side, as well as firing simulator for carrying out this method. 4,695,256, Cl. 434-22.000.

Eickholt, Hubert: *See—*
Henne, Heinrich; Blaszczyk, Gotthardt; Eickholt, Hubert; and Lohnherr, Ludger, 4,694,994, Cl. 241-79.100.

Eidsmore, Paul G. Fluid-flow isolation and control apparatus and method. 4,694,860, Cl. 137-614.210.

Eisenloeffel, Helmut, to Valco/Valley Tool & Die, Inc. Compression clamp for a picture frame. 4,694,598, Cl. 40-155.000.

Ekelund, Folke J. B.; Lilja, Per O.; Wald, Roland J. E.; and Stahl, Matts F., to Telefonaktiebolaget LM Ericsson. Protective circuit for a hacker type DC converter. 4,695,413, Cl. 361-18.000.

Elettronica San Giorgio-Elsag S.p.A.: *See—*
Musso, Giorgio, 4,696,049, Cl. 382-22.000.

Eli Lilly and Company: *See—*
Nakatsukasa, Walter M., 4,695,545, Cl. 435-119.000.

Eller, Thomas D.; Halushka, Perry V.; Knapp, Daniel R.; and Mais, Dale, to Drug Science Foundation. Aromatic derivatives of 13-aza-prostanoic acid. 4,695,647, Cl. 560-53.000.

Ellig, Daniel L.: *See—*
Gattuso, Mark J.; and Ellig, Daniel L., 4,695,560, Cl. 502-222.000.

Ellis, Joseph J., Jr., to International Business Machines Corporation. Plasma panel display selectively updatable on pel line basis. 4,695,838, Cl. 340-771.000.

Elmec Corporation: *See—*
Kameya, Kazuo, 4,695,812, Cl. 333-156.000.

Elscint Ltd.: *See—*
Egozi, Avihay, 4,696,030, Cl. 379-167.000.

Else, Ronald, to British Telecommunications public limited company. One-piece telephone hook switch operating mechanism. 4,696,033, Cl. 379-424.000.

Elsenbaumer, Ronald L.: *See—*
Shacklette, Lawrence W.; Toth, James E.; and Elsenbaumer, Ronald L., 4,695,521, Cl. 429-194.000.

Elsener, Carl. Ear ornamentation. 4,694,664, Cl. 63-12.000.

Elsmo, Thad; and Horvath, Ronald. Tamperproof package. 4,694,971, Cl. 215-253.000.

Emelyanov, Sergei I.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Emerson Electric Co.: *See—*
Schmitt, Thomas J., 4,694,932, Cl. 182-109.000.

Emhart Industries Inc.: *See—*
Merchant, David E., 4,695,686, Cl. 200-61.860.
Nebelung, Hermann H., 4,695,307, Cl. 65-242.000.

EMR Elektronische Messund Regelgerate Gesellschaft m.b.H.: *See—*
Rieder, Heinz; and Schwaiger, Max, 4,695,720, Cl. 250-231.0SE.

Emuge-Werk Richard Glimpel Fabrik fuer Praezisionswerkzeuge (vormals Moschkau & Glimpel): *See—*
Schmidt, Wolfgang, 4,694,944, Cl. 192-56.00R.

Endo, Kazuma: *See—*
Endo, Shigeharu; and Endo, Kazuma, 4,694,993, Cl. 241-46.110.

Endo, Shigeharu; and Endo, Kazuma. Crushing and washing processing appartus for ballast and sand. 4,694,993, Cl. 241-46.110.

Endou, Hideyasu: *See—*
Itagaki, Masanori; Takahashi, Junichi; and Endou, Hideyasu, 4,695,678, Cl. 174-52.0FP.

Energy Conversion Devices, Inc.: *See—*
Guha, Subhendu; and Agarwal, Satish, 4,695,859, Cl. 357-19.000.

Enertrols, Inc.: *See—*
Heideman, Robert J.; and Mitera, Richard T., 4,694,939, Cl. 188-287.000.

Engineering Management Data Processing (E.M.D.P.): *See—*
Desport, Lucien A., 4,695,032, Cl. 249-112.000.

Engler, David A.; and Maistrovich, Anthony R., to Minnesota Mining and Manufacturing Company. Continuous process for making polymers having pendant azlactone or macromolecular moieties. 4,695,608, Cl. 525-308.000.

English Clays Lovering Pochin & Company: *See—*
Goodman, Howard; and Fugler, Andrew R., 4,695,511, Cl. 428-404.000.

English Electric Valve Company Limited: *See—*
Nixon, Ralph D., 4,695,764, Cl. 313-497.000.
Nixon, Ralph D., 4,695,765, Cl. 313-497.000.

Enkegaard, Torben, to F. L. Smidth & Co. A/S. Method and apparatus for producing clinker. 4,695,325, Cl. 106-100.000.

Enoki, Takatomo; Yamasaki, Kimiyoshi; and Ohwada, Kuniki. Method for the manufacture of a Schottky gate field effect transistor. 4,694,564, Cl. 437-40.000.

Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, to Director-General of the Agency of Industrial Science & Technology. Combustor of gas turbine. 4,695,247, Cl. 431-352.000.

EOL$_3$ Company, Inc.: *See—*
Dill, James M., 4,695,718, Cl. 250-213.0VT.

Epstein, David. Panoramic rear view automobile mirror. 4,695,138, Cl. 350-615.000.

Era, Yoshiyuki; and Kumagai, Yasuo, to Okabe Co., Ltd. Joint for reinforcing bar employed in concrete construction. 4,695,178, Cl. 403-14.000.

Erhardt, Manfred: *See—*
Loos, Herbert; and Erhardt, Manfred, 4,694,617, Cl. 51-287.000.

Erickson, Curtis W. Portable elevating device. 4,694,934, Cl. 182-142.000.

Erickson, William R.: *See—*
Berry, W. Wes; and Erickson, William R., 4,695,387, Cl. 210-676.000.

Erlandsson, Kjell I., to Kelley Company, Inc. Vehicle restraint. 4,695,216, Cl. 414-401.000.

Ermacora, Rino; and Jehl, Patrice, to Kuhn S.A. Mowing machine for cutting hay and cereal grass. 4,694,640, Cl. 56-16.400.

Ernst Leitz Wetzlar GmbH: *See—*
Jacoby, Hans-Dieter; and Schmidt, Peter, 4,695,215, Cl. 414-225.000.

Ersfeld, Heinrich: *See—*
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.

Eshoff, Donald D.: *See—*
Mendonsa, Alvin A.; and Eshoff, Donald D., 4,695,022, Cl. 248-176.000.

Eskelinen, Pekka, to Valmet Oy. Method and apparatus in a twin-wire cylinder drying section of a paper machine. 4,694,587, Cl. 34-23.000.

Eslick, Mark: *See—*
Zivitz, Maury; Ko, Eric; and Eslick, Mark, 4,695,164, Cl. 356-427.000.

Esparza, Natividad G. System for the self-lighting of cigarettes. 4,694,841, Cl. 131-351.000.

Esperanza y Cia, S.A.: *See—*
Ibarra, Inigo A., 4,694,755, Cl. 102-445.000.

Esselte Meto International GmbH: *See—*
Volk, Heinrich; Harter, Karl; and Dotter, Fritz, 4,694,745, Cl. 101-111.000.

Essex Group, Inc.: *See—*
Graham, Randall C., 4,695,830, Cl. 340-677.000.

Essig, Willi; and Petri, Heinz, to E.G.O. Elektro-Gerate Blanc u. Fischer. Thermal cut-out. 4,695,816, Cl. 337-394.000.

Estes, Donna L.; and Hilson, Carol A. Combination garment and protective seat cover. 4,694,511, Cl. 2-69.000.

Eszakmagyarorszagi Vegyimuvek: *See—*
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

ETA SA Fabriques D'Ebauches: *See—*
Meister, Pierre-Andre ; Schmidli, Pierre; and Soltermann, Bertrand, 4,695,168, Cl. 368-31.000.

Etablissement Public de Diffusion, dit "Telediffusion de France" : *See—*
Carlach, Jean-Claude, 4,696,020, Cl. 377-48.000.
Palicot, Jacques P.; and Dublet, Guy P., 4,696,015, Cl. 375-14.000.

Etani, Tadao: *See—*
Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, 4,695,007, Cl. 242-58.400.

Etat Francais represent par le Secretariat d'Etat aux Postes et Telecommunications (Centre National d'Etudes des Telecommuncations): *See—*
Carlach, Jean-Claude, 4,696,020, Cl. 377-48.000.

ETD Technology, Inc.: *See—*
Heikkila, Kurt E.; Williams, Rodney K.; and Pylkki, Russell J., 4,694,682, Cl. 73-61.10C.

Ethyl Corporation: *See—*
Laurent, Sebastian M.; and Sanders, Robert N., 4,695,461, Cl. 424-154.000.

Eugene Tech International, Inc.: *See—*
Prince, Alfred M.; and Kim, Kwang S., 4,695,454, Cl. 424-89.000.

Eutectic Corporation: *See—*
Gartland, Thomas J., 4,695,702, Cl. 219-137.630.

Evans, Steven; and Lum, Kin K., to Eastman Kodak Company. Cyan dye-donor element used in thermal dye transfer. 4,695,287, Cl. 8-471.000.

Everett, Charles J.; and Ochsner, Rolf H., to Robertshaw Controls Company. Temperature level indicating device and method of making the same. 4,695,829, Cl. 340-586.000.

Everhart, Robert W.; and Huck, Charles T., to American Telephone and Telegraph Company AT&T-Technologies. Methods of and systems for transmitting oscilloscope signals. 4,695,836, Cl. 340-750.000.

Ewan, George B.: *See—*
Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,695,578, Cl. 514-397.000.

Ex-Cell-O Corporation: *See—*
Scrivo, Jerry V.; and Breuker, Gordon W., 4,695,433, Cl. 422-112.000.

Excelermatic Inc.: *See—*
Kraus, Charles E., 4,694,704, Cl. 74-200.000.

Exxon Production Research Company: *See—*
Paal, Ernest F., 4,695,984, Cl. 367-54.000.

Exxon Research and Engineering Company: *See—*
West, Theodore H., 4,695,363, Cl. 208-33.000.

Ezernack, Daniel D.; and Armstrong, Robert B., to M. W. Kellogg Company, The. Diesel fuel production. 4,695,367, Cl. 208-106.000.

F. Gegauf AG Bernina Nahmaschinenfabrik: *See—*
Janouschek, Heinz, 4,694,764, Cl. 112-237.000.

F. L. Smidth & Co. A/S: *See—*
Enkegaard, Torben, 4,695,325, Cl. 106-100.000.

Fabbro, Miguel, to Bifa Corporation. Grille apparatus. 4,694,816, Cl. 126-41.00R.

Facet Enterprises, Inc.: *See*—
Tallis, John R., Jr.; and Volino, Nicholas A., 4,695,735, Cl. 290-38.00R.

Faessen, Louis M. H.; and Khoe, Giok D., to U.S. Philips Corp. Viewer having head mounted display unit for cinerama pictures. 4,695,129, Cl. 350-96.250.

FAG Kugelfischer Georg Schafer (KGaA): *See*—
Dreschmann, Peter; and Walter, Wilhelm, 4,695,062, Cl. 277-27.000.

Fair, David L.: *See*—
Woodard, Kenneth E., Jr.; Dean, Robert A.; Fair, David L.; and Fister, Julius C., Jr., 4,695,359, Cl. 204-255.000.

Fairchild Semiconductor Corporation: *See*—
Lam, Nim C., 4,695,749, Cl. 307-455.000.

Fairdale Orthodontic Company: *See*—
Mariol, James F., 4,695,250, Cl. 433-5.000.

Faisandier, Yves, to A2F. Electronic device providing a universal interface between sensors and an acquisition and processing unit of the signals originating from said sensors. 4,695,955, Cl. 364-413.000.

Falk, Karl-Erik L.: *See*—
Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., 4,695,272, Cl. 604-84.000.

Falk, Timothy L.: *See*—
Leber, David C.; and Falk, Timothy L., 4,694,572, Cl. 29-840.000.

Faltermeier, Bernd: *See*—
Jorgens, Reinhard; Faltermeier, Bernd; and Trautwein, Franz, 4,695,137, Cl. 350-521.000.

FANUC LTD: *See*—
Inaba, Yoshiharu, 4,695,237, Cl. 425-135.000.
Kurakake, Mitsuo; Sakamoto, Keiji; and Toyosawa, Yukio, 4,695,780, Cl. 318-561.000.

Farrall, George A.; and Seymour, Raymond K., to General Electric Company. Electrical contact construction. 4,695,688, Cl. 200-144.00B.

Farrell, Gregory A., to Technicon Instruments Corporation. Volumetric pumping apparatus and method for supplying fluids to sheath stream flow cells. 4,695,431, Cl. 422-81.000.

Fast, Jacob. Product information display tag. 4,694,595, Cl. 40-19.500.

Fast, Jacob. Merchandise information tag with improved mounting portion. 4,694,596, Cl. 40-20.00R.

Faulconer, Mark; and Greatrake, Scott E., to U.S.D. Corp. Diver's buoyancy compensator belt. 4,694,772, Cl. 114-315.000.

Faust, Eberhard; Niethammer, Kurt; and Hammer, Ludwig, to Daimler-Benz Aktiengesellschaft. Arrangement for securing the end position of a guided support rod of a headrest. 4,695,095, Cl. 297-410.000.

Fehn, John H.: *See*—
Arakawa, Mitsuaki; Fehn, John H.; and Crooks, Lawrence E., 4,695,801, Cl. 324-318.000.

Feild, Alexander L., Jr., to Westinghouse Electric Corp. Process for coating the internal surface of zirconium tubes with neutron absorbers. 4,695,476, Cl. 427-6.000.

Feldman, Steven; and Tennant, Robert J., to AMP Incorporated. Surface mount, miniature connector. 4,695,106, Cl. 439-83.000.

Fendley, James R., to Zenith Electronics Corporation. Tension shadow mask support structure. 4,695,761, Cl. 313-407.000.

Ferrante, Cesare M.: *See*—
Ferrari Aggradi, Gian P.; and Ferrante, Cesare M., 4,695,202, Cl. 405-227.000.

Ferrari Aggradi, Gian P.; and Ferrante, Cesare M., to Nuovo Pignone S.p.A. System of submarine linking between the legs of a platform and the relating foundation piles. 4,695,202, Cl. 405-227.000.

Ferrell, Charles W.: *See*—
Hooker, Lane K.; Howell, Thomas H.; and Ferrell, Charles W., 4,695,951, Cl. 364-200.000.

Feth, John R.: *See*—
Chang, Chin-Lung; and Feth, John R., 4,695,123, Cl. 350-96.150.

Feuling, James J. Friction reduction for moving elements in contact with a fluid medium. 4,695,229, Cl. 416-241.00A.

Feuring, Kurt, to Buderus Aktiengesellschaft. Process for producing castings. 4,694,879, Cl. 164-7.200.

Fibre Converters, Inc.: *See*—
Robinson, Leonard W., 4,695,501, Cl. 428-159.000.

Fierens, Gustaaf E. M., to U.S. Philips Corporation. Loudspeaker arrangement comprising one or more flat diaphragms. 4,696,037, Cl. 381-24.000.

Fikentscher, Rolf: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Fildes, John M.; and Krueger, Robert H., to Borg-Warner Corporation. Cutting tool wear monitor. 4,694,686, Cl. 73-104.000.

Fingermatrix, Inc.: *See*—
Schiller, Michael, 4,696,046, Cl. 382-5.000.

Fink, Gerald R.: *See*—
Botstein, David; Fink, Gerald R.; and Davis, Ronald W., 4,695,470, Cl. 426-37.000.

Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D., and Johnson, Johnny R., to NL Chemicals, Inc. Organophilic clay gellants and process for preparation. 4,695,402, Cl. 252-315.200.

Fischer, Jay P. Quick release clamp. 4,695,030, Cl. 248-507.000.

Fischer, Klaus, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for the formation of single crystals from the gas phase. 4,695,347, Cl. 156-610.000.

Fischer, Lothar: *See*—
Homann, Walter K.; and Fischer, Lothar, 4,695,661, Cl. 568-903.000.

Fischer, William H.: *See*—
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.

Fisher, Albert W., to RCA Corporation. Patterned metallization for integrated circuits. 4,695,868, Cl. 357-68.000.

Fister, Julius C., Jr.: *See*—
Woodard, Kenneth E., Jr.; Dean, Robert A.; Fair, David L.; and Fister, Julius C., Jr., 4,695,359, Cl. 204-255.000.

Fitzmayer, Louis H.: *See*—
Staats, James E.; and Fitzmayer, Louis H., 4,695,693, Cl. 219-10.55F.

Fleckenstein, Phillip P.; and Marsh, Norman F., to Berwind Corporation. Rotating paddle bin level indicator. 4,695,685, Cl. 200-61.210.

Fleisher, Martin; Bradlow, H. Leon; and Schwartz, Morton K., to Sloan-Kettering Institute for Cancer Research. Breast cyst fluid screening method for cancer risk assessment. 4,695,471, Cl. 436-64.000.

Fletcher, Ian J.: *See*—
Bedekovic, Davor; and Fletcher, Ian J., 4,695,636, Cl. 546-116.000.

Flexible Steel Lacing Company: *See*—
Musil, Edward C., 4,694,958, Cl. 206-340.000.

Floating Technology Company Limited, The: *See*—
Wagstaff, William L., 4,695,191, Cl. 405-195.000.

Flockenhaus, Claus: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Flohrs, Peter; and Michel, Hartmut, to Robert Bosch GmbH. Monolithically integrated planar semiconductor arrangement. 4,695,867, Cl. 357-46.000.

Flora, David D.: *See*—
Snyder, Steven A.; Smith, Jack; Flora, David D.; and Bartlett, Robert L., 4,694,713, Cl. 82-14.00R.

Florida State University: *See*—
Mizuno, Akira; and Clements, Judson S., 4,695,358, Cl. 204-174.000.

Flosi, Corrado; Gobbi, Alberto; Maccioni, Roberto; and Simonetta, Guerrieri. Upper body protector for off-road riders. 4,694,505, Cl. 2-2.000.

Floyd, Lawrence, Jr.: *See*—
Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., 4,695,524, Cl. 430-32.000.

Floyd, William C.; and Hui, Sai H., to Sun Chemical Corporation. Coating binder additive. 4,695,606, Cl. 525-160.000.

Fluechter, Horst: *See*—
Rossmann, Christian; Fluechter, Horst; Schreiber, Gerald; and Wichelhaus, Winfried, 4,695,396, Cl. 252-135.000.

Flutec Fluidtechinische Gerate GmbH: *See*—
Klauck, Manfred, 4,695,232, Cl. 417-410.000.

Flyborg, Nils O.; and Bjorheden, Orvar, to Kamewa AB. Propeller assembly. 4,694,645, Cl. 60-221.000.

Flynn, William M., to Westinghouse Electric Corp. Cell for a spent nuclear fuel rack. 4,695,424, Cl. 376-272.000.

FMC Corporation: *See*—
Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., 4,695,658, Cl. 568-763.000.

Focalpoint Armoury Limited: *See*—
Cannon, Albert W., 4,695,159, Cl. 356-247.000.

Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz; and Liedtke, Kurt, 4,694,714, Cl. 83-13.000.

Focke, Heinz; and Liedtke, Kurt, to Focke & Co. (GmbH & Co.). Process and apparatus for changing reels in connection with packaging machines. 4,694,714, Cl. 83-13.000.

Foggini, Paolo, to Foggini Progetti S.r.l. Device for controlling opening and closing of movable objects, in particular doors and drawers in motor vehicles, having mutually cooperating stator and rotor. 4,694,530, Cl. 16-82.000.

Foggini Progetti S.r.l.: *See*—
Foggini, Paolo, 4,694,530, Cl. 16-82.000.

Fogt, Eric J.: *See*—
Meyerhoff, Mark E.; Fogt, Eric J.; and Untereker, Darrel F., 4,694,834, Cl. 128-635.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Two compartment carryout carton. 4,694,987, Cl. 229-114.000.

Forch, Hans: *See*—
Schmitt, Wolfgang; and Forch, Hans, 4,695,063, Cl. 277-134.000.

Ford Aerospace & Communications Corporation: *See*—
Motooka, Wesley D., 4,695,722, Cl. 250-235.000.

Ford, George A., to R. C. Ltd. Continuous coring drill bit. 4,694,916, Cl. 175-249.000.

Ford Motor Company: *See*—
Frost, Derek, 4,694,789, Cl. 123-90.170.

Fordyce, William A.: *See*—
Stevens, James C.; and Fordyce, William A., 4,695,669, Cl. 585-511.000.

Forslund, Alf; and Andersson, Goran, to Convey Teknik AB. Method and apparatus for pressing powder material. 4,695,414, Cl. 264-3.100.

Forsythe, Curtis J., to Breddo, Inc. Shortening replacing and fresh slice improving agents for yeast-raised bakery products. 4,695,469, Cl. 426-24.000.

Forte, Mark R.; Khowaylo, Alex; and Schloesser, Ewald, to Osteonics Corp. Acetabular cup assembly with selective bearing face orientation. 4,695,282, Cl. 623-22.000.
Foseco International Limited: *See*—
Butler, David R.; and Corbett, Clifford F., 4,694,884, Cl. 164-359.000.
Foss, Art J.: *See*—
Crosby, Michael A.; and Foss, Art J., 4,695,262, Cl. 446-236.000.
Foster Wheeler Energy Corporation: *See*—
Gorzegno, Walter P.; and Abdulally, Iqbal F., 4,694,758, Cl. 110-347.000.
Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, 4,695,444, Cl. 423-569.000.
Rabe, George B., 4,694,549, Cl. 29-157.30C.
Rabe, George B., 4,694,677, Cl. 72-393.000.
Fowler, George F., Jr.; and Lehnert, Charles W., to Georgia-Pacific Corporation. Fire-resistant article and method of manufacture. 4,695,494, Cl. 428-71.000.
Fox, Cheryl: *See*—
Fox, Jeffrey A.; and Fox, Cheryl, 4,695,029, Cl. 248-360.000.
Fox, Jeffrey A.; and Fox, Cheryl. Support device for securing a razor to a shaving cream dispenser. 4,695,029, Cl. 248-360.000.
Fox, Richard L. Protected hypodermic needle. 4,695,274, Cl. 604-198.000.
Foy, Peter S. Suspended overhead hollow track support system. 4,694,531, Cl. 16-87.40R.
Framatome: *See*—
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, 4,694,585, Cl. 33-502.000.
Franco, Simone: *See*—
Delfino, Gerolamo; Franco, Simone; and Verdi, Cesare, 4,695,531, Cl. 430-513.000.
Frankhouse, Thomas J.; and Spease, Arthur L., to Teleflex Incorporated. Molded terminal for remote control assembly (lollipop). 4,694,705, Cl. 74-501.00R.
Franz Haas Waffelmaschinen Industriegesellschaft m.b.H.: *See*—
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,694,741, Cl. 99-354.000.
Fredenburgh, Evan A.: *See*—
Matuska, David G.; and Fredenburgh, Evan A., 4,695,341, Cl. 156-161.000.
Fretz, Walter; and Hefti, Walter, to Maschinenfabrik Rieter AG. Device for winding-up a thread. 4,695,000, Cl. 242-18.0DD.
Freudberg, Richard L.; and Garrison, Marshall B., to Wang Laboratories, Inc. Signal detection and discrimination using waveform peak factor. 4,696,031, Cl. 379-386.000.
Friedlander, Randal H.; Nash, Sheryl A.; and Komitor, Greg A., to Century Adhesives Corp. Peel-and-stick carpet assemblies, components thereof and methods of construction. 4,695,493, Cl. 428-40.000.
Friesen, Peter. Rotational arm for molding machine. 4,695,244, Cl. 425-429.000.
Frimair S.A.: *See*—
Bagolin, Alain; and Gay, Joel, 4,694,588, Cl. 34-77.000.
Frisco, Jeffrey A.: *See*—
Heckaman, Douglas E.; Higman, Roger H.; Frisco, Jeffrey A.; and Bajgrowicz, Edward J., 4,695,810, Cl. 333-1.000.
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, to Framatome. Device for measuring clearance around a pin for centering the upper internal equipment of a pressurized water nuclear. 4,694,585, Cl. 33-502.000.
Frizzell, Kenneth P.: *See*—
Christini, Roy A.; and Frizzell, Kenneth P., 4,695,320, Cl. 75-67.00A.
Fronda Limited: *See*—
Boston, Ronald P., 4,695,468, Cl. 426-8.000.
Frost, Derek, to Ford Motor Company. Variable valve timing. 4,694,789, Cl. 123-90.170.
Frye, Ruth E. Therapeutic stuffed toy. 4,694,829, Cl. 128-399.000.
FSI Corporation: *See*—
Grant, Robert W., 4,694,852, Cl. 137-501.000.
Fuchs, Gerhard: *See*—
Ehle, Joachim; Fuchs, Gerhard; Kimmer, Klaus; and Langfeldt, Horst-Rudiger, 4,696,013, Cl. 373-71.000.
Fuchs Systemtechnik GmbH: *See*—
Ehle, Joachim; Fuchs, Gerhard; Kimmer, Klaus; and Langfeldt, Horst-Rudiger, 4,696,013, Cl. 373-71.000.
Fugler, Andrew R.: *See*—
Goodman, Howard; and Fugler, Andrew R., 4,695,511, Cl. 428-404.000.
Fuji Electric Co., Ltd.: *See*—
Monno, Asao; Watanabe, Kiyoo; and Kaneko, Kazuyuki, 4,695,729, Cl. 250-358.100.
Fuji Electric Co., Ltd: *See*—
Tominaga, Hiroshi, 4,694,521, Cl. 5-453.000.
Fuji Electric Corporate Research and Developement Ltd.: *See*—
Sagisawa, Shinobu; Takahama, Teizo; and Kobayashi, Mitsuo, 4,695,963, Cl. 364-513.000.
Fuji Facom Corporation and Kawasaki Steel Corporation: *See*—
Monno, Asao; Watanabe, Kiyoo; and Kaneko, Kazuyuki, 4,695,729, Cl. 250-358.100.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Kurokawa, Ryogo; Oyama, Fusami; and Takahashi, Akira, 4,695,069, Cl. 280-91.000.
Miyamoto, Yasuhiko, 4,694,810, Cl. 123-516.000.
Nagai, Masaaki, 4,694,801, Cl. 123-425.000.
Yamashita, Masatoshi; and Tsunoda, Norio, 4,695,059, Cl. 273-360.000.
Fuji Photo Film Co., Ltd.: *See*—
Abe, Akira; Nakajima, Junya; and Nishikawa, Toshihiro, 4,695,529, Cl. 430-351.000.
Mori, Nobufumi; Hosoi, Yuichi; Takahashi, Kenji; and Miyahara, Junji, 4,695,725, Cl. 250-327.200.
Moriwaki, Masayoshi, 4,695,912, Cl. 360-133.000.
Nagano, Masahiko; and Sakaki, Naoaki, 4,695,899, Cl. 358-310.000.
Nakamura, Kotaro; and Ishikawa, Takatoshi, 4,695,530, Cl. 430-381.000.
Oshikoshi, Yuji; Kato, Masashi; and Kikuchi, Hisashi, 4,695,143, Cl. 354-86.000.
Sugihara, Mitsuru; and Sugimoto, Naohiko, 4,695,354, Cl. 204-180.100.
Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, 4,695,525, Cl. 430-151.000.
Utsugi, Mikio, 4,695,905, Cl. 360-33.100.
Watanabe, Hideo; and Nakajima, Nobuyoshi, 4,695,726, Cl. 250-327.200.
Fuji Photo Optical Co., Ltd.: *See*—
Kondo, Mitsuo, 4,694,821, Cl. 128-4.000.
Fuji Seal Industry Co., Ltd.: *See*—
Fujio, Masaaki; and Yamamoto, Tetsuhiro, 4,694,633, Cl. 53-49.000.
Fujieda, Yasuhiko: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.
Fujii, Isao: *See*—
Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; and Fujii, Isao, 4,694,799, Cl. 123-425.000.
Fujii, Noriaki: *See*—
Kodai, Syojiro; Fujii, Noriaki; Gamo, Hiroshi; and Kobayashi, Bujirou, 4,695,925, Cl. 361-395.000.
Fujii, Shoichiro: *See*—
Takanohashi, Kunio; Yoshida, Tsuneaki; and Fujii, Shoichiro, 4,695,639, Cl. 548-165.000.
Fujio, Masaaki; and Yamamoto, Tetsuhiro, to Fuji Seal Industry Co., Ltd. Film wrapping machine. 4,694,633, Cl. 53-49.000.
Fujirex Company, Limited: *See*—
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, 4,694,748, Cl. 101-401.100.
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, to Fujirex Company, Limited. Device for moving offset plates. 4,694,748, Cl. 101-401.100.
Fujisawa, Norio: *See*—
Yamaura, Mitsuru; and Fujisawa, Norio, 4,695,931, Cl. 363-8.000.
Fujisawa Pharmaceutical Co., Ltd.: *See*—
Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, 4,695,466, Cl. 424-456.000.
Uemura, Toshinobu; Shinooka, Kiyohide; and Kajiho, Tokuaki, 4,695,467, Cl. 424-502.000.
Fujita, Shigeru; Banzai, Hideo; and Takada, Makoto, to Toshiba Kikai Kabushiki Kaisha. Monitoring data display method and device. 4,695,965, Cl. 364-518.000.
Fujitsu Limited: *See*—
Itakura, Tohru, 4,695,978, Cl. 365-51.000.
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, 4,695,175, Cl. 400-196.100.
Yoshizawa, Takeshi, 4,694,527, Cl. 15-308.000.
Fujiwara, Kozo: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.
Fukano, Michio: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.
Fukasawa, Akira: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.
Fukase, Hisahiko: *See*—
Matsui, Kunio; Fukase, Hisahiko; and Nomura, Akihiro, 4,694,887, Cl. 164-428.000.
Fukumizu, Shinnichi; Inoue, Kimio; and Kuriyama, Akimasa, to Kabushiki Kaisha Kobe Seiko Sho. Cavity transfer mixing extruder. 4,695,165, Cl. 366-90.000.
Fukumoto, Fumio: *See*—
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.
Fukura, Kenichi: *See*—
Yukimoto, Kazuyoshi; Fukura, Kenichi; and Yamauchi, Nobuhiro, 4,695,036, Cl. 254-126.000.
Fukutani, Masanori: *See*—
Okajima, Atushi; Yoshida, Hitoshi; Takeuchi, Yukihisa; and Fukutani, Masanori, 4,695,301, Cl. 55-523.000.
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, to Mazda Motor Corporation. Upper body structure of an open-top vehicle. 4,695,089, Cl. 296-107.000.
Fukuzo, Yukio; and Inoue, Yasukazu, to NEC Corporation. Integrated circuit having a common input terminal. 4,695,980, Cl. 365-222.000.
Fulkerson, Emmet M.; Somers, Ralph M.; and Compton, Diana R., to General Electric Company. Surface texture recognition using multi-directional scanning. 4,695,721, Cl. 250-234.000.

Fuller, Charles L. Fume exhaust system for photo print processors. 4,695,146, Cl. 354-309.000.

Fuller Company: *See*—
Schonbach, Bernard H., 4,694,997, Cl. 241-117.000.

Fumino, Ichiro, to Nippon Tansan Gas Co., Ltd. Gas supply mechanism. 4,694,850, Cl. 137-318.000.

Furstwangler, Walter: *See*—
Gorner, Horst; Furstwangler, Walter; and Usbeck, Walter, 4,695,048, Cl. 271-122.000.

Furukawa Electric Co., Ltd., The: *See*—
Himono, Yusaku; Moriya, Yoshiaki; Miyahara, Masato; and Suzuki, Kazuhiro, 4,695,124, Cl. 350-96.200.

Furukawa, Hiroaki: *See*—
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, 4,695,730, Cl. 250-370.000.

Furukawa, Naoki, to Yamaha Hatsudoki Kabushiki Kaisha. Overheat warning and prevention system for outboard engines. 4,695,822, Cl. 340-53.000.

Furukawa, Yoshimi: *See*—
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,695,068, Cl. 280-91.000.

Fusion Systems Corporation: *See*—
Hill, James D.; and Wooden, Gene R., 4,695,694, Cl. 219-10.55D.
Ury, Michael G.; and Wood, Charles H., 4,695,757, Cl. 313-44.000.

Gabriele, E. Helena-Maria Siegel, heiress: *See*—
Harnisch, Horst; and Siegel, Edgar, deceased, 4,695,405, Cl. 252-600.000.

Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, to Robert Bosch GmbH. Ignition system for internal combustion engines with a magnet generator. 4,694,814, Cl. 123-644.000.

Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, to Cselt - Centro Studi e Laboratori Telecommunicazioni S.p.A. Reconfigurable high-speed integrated local network. 4,696,001, Cl. 370-88.000.

Galtier, Pierre; and Busson, Christian, to Institut Francais du Petrole. Process and apparatus for fluid bed catalytic cracking. 4,695,370, Cl. 208-113.000.

Gambertoglio, Louis M., to Hughes Tool Company. Disconnect sub for a tubing conveyed perforating gun. 4,694,878, Cl. 166-377.000.

Gamo, Hiroshi: *See*—
Kodai, Syojiro; Fujii, Noriaki; Gamo, Hiroshi; and Kobayashi, Bujirou, 4,695,925, Cl. 361-395.000.

Gangarosa, Raymond E.: *See*—
Blakeley, Douglas M.; Kershaw, Carolyn A.; and Gangarosa, Raymond E., 4,694,837, Cl. 128-653.000.

Gannaway, Edwin L., to Tecumseh Products Company. Refrigeration system including capacity modulation. 4,694,660, Cl. 62-196.400.

Gannis, Aphrodite: *See*—
Gannis, Peter M.; and Gannis, Aphrodite, 4,695,452, Cl. 424-59.000.

Gannis, Peter M.; and Gannis, Aphrodite. Cosmetic stick. 4,695,452, Cl. 424-59.000.

Gannon, Patrick M.: *See*—
Brandt, Henry R.; Gannon, Patrick M.; Leung, Wan L.; and Marchini, Timothy R., 4,695,950, Cl. 364-200.000.

Garabedian, Aram: *See*—
Choy, Clement K.; Keen, Frederick I.; Garabedian, Aram; and Spurgeon, Colleen J., 4,695,394, Cl. 252-97.000.

Garcia, Armando; and Nesmith, David V. Mosquito eliminator. 4,694,605, Cl. 43-137.000.

Garg, Diwakar; Givens, Edwin N.; and Schweighardt, Frank K., to Air Products and Chemicals, Inc. Catalytic hydroconversion of heavy oil using two metal catalyst. 4,695,369, Cl. 208-112.000.

Garrison, Marshall B.: *See*—
Freudberg, Richard L.; and Garrison, Marshall B., 4,696,031, Cl. 379-386.000.

Gartland, Thomas J., to Eutectic Corporation. Welding-process handle for interchangeable welding-process heads. 4,695,702, Cl. 219-137.630.

Gas Research Institute: *See*—
McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., 4,694,913, Cl. 175-61.000.

Gateau, Paul: *See*—
Stern, Robert; Hillion, Gerard; Gateau, Paul; and Guibet, Jean-Claude, 4,695,411, Cl. 260-410.90R.

Gattuso, Mark J.; and Ellig, Daniel L., to UOP Inc. Catalyst for the selective hydrogenation of diolefinic hydrocarbons. 4,695,560, Cl. 502-222.000.

Gay, Joel: *See*—
Bagolin, Alain; and Gay, Joel, 4,694,588, Cl. 34-77.000.

Gaylord, Francis L.: *See*—
Morelli, Amedeo J.; and Gaylord, Francis L., 4,694,568, Cl. 29-620.000.

GEA Energiesystemtechnik GmbH & Co.: *See*—
Borchert, Werner, 4,694,892, Cl. 165-95.000.

Gebr. Hofmann GmbH & Co. Kg Maschinenfabrik: *See*—
Goebel, Eickhart, 4,694,875, Cl. 157-1.240.

Gebruder Junghans GmbH: *See*—
Moosmann, Horst, 4,694,751, Cl. 102-202.000.

Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, to Bayer Aktiengesellschaft. Herbicidal substituted 5-amino-1-aryl-pyrazoles. 4,695,308, Cl. 71-86.000.

Geissler, Ulrich; and Lampas, Heide, to Hoechst Aktiengesellschaft. Radiation-polymerizable composition and process for the application of markings to a printed circuit board. 4,695,527, Cl. 430-256.000.

Gelardi, Anthony L., to Shape Inc. Leader tape staking rod and related method of assembly. 4,694,557, Cl. 29-525.000.

Gem Industries, Inc.: *See*—
Benoit, Roland A., 4,694,519, Cl. 5-200.00C.

Gendelman, Mikhail A.; Borodulin, Anatoly F.; Golubeva, Diana F.; and Bychkov, Sergei V., to Klimovskoe Spetsialnoe Konstruktorskoe Bjuro Po Proektirovaniju Tkatskogo Oborudovania. Loom reed. 4,694,867, Cl. 139-192.000.

Genentech, Inc.: *See*—
Heinrich, William P.; and Leopoldi, Norbert, 4,694,581, Cl. 33-169.00R.

General Dynamics Electronics Division: *See*—
Mathis, Ronald F., 4,695,790, Cl. 324-77.00K.

General Electric Company: *See*—
Anthony, Thomas R.; Lindner, Philip A.; and Tucker, Jewell G., 4,695,760, Cl. 313-348.000.
Banfi, Claudio, 4,695,690, Cl. 200-147.00R.
Covington, Edward J.; Cridland, John E.; and Gorman, John P., 4,695,768, Cl. 315-73.000.
Dawson, John, 4,695,220, Cl. 415-9.000.
Farrall, George A.; and Seymour, Raymond K., 4,695,688, Cl. 200-144.00B.
Fulkerson, Emmet M.; Somers, Ralph M.; and Compton, Diana R., 4,695,721, Cl. 250-234.000.
Hardy, Christopher J.; and Edelstein, William A., 4,695,799, Cl. 324-307.000.
Kumar, Ajith K., 4,695,941, Cl. 364-165.000.
Lown, Harold, 4,695,224, Cl. 415-116.000.
Miller, Russell S., 4,694,663, Cl. 62-514.00R.
Pressman, Eric, 4,695,594, Cl. 521-92.000.
Staats, James E.; and Fitzmayer, Louis H., 4,695,693, Cl. 219-10.55F.
Steigerwald, Robert L.; and Mistry, Keku M., 4,695,934, Cl. 363-17.000.
Takekoshi, Tohru; and Anderson, Patricia P., 4,695,612, Cl. 525-433.000.
Zarnoch, Kenneth P.; and Iacovangelo, Charles D., 4,695,489, Cl. 427-438.000.

General Foods Corporation: *See*—
Cuneo, Carol A.; and Lambert, Charles, 4,695,474, Cl. 426-579.000.

General Indicator Corporation: *See*—
Murray, Ledell L., 4,694,600, Cl. 40-518.000.

General Instrument Corp.: *See*—
Sapitowicz, Thomas P., 4,695,171, Cl. 400-70.000.

General Motors Corporation: *See*—
Belleau, Gordon F.; Jelcin, Michael J.; and Verga, Charles F., 4,695,342, Cl. 156-173.000.
Coleman, John R., 4,694,652, Cl. 60-585.000.
O'Brien, Gerald A., 4,694,676, Cl. 72-348.000.
Wycech, Joseph S., 4,695,343, Cl. 156-196.000.

General Signal Corporation: *See*—
Sutton, Gary, 4,694,858, Cl. 137-596.000.

General Telephone Company of Indiana: *See*—
Plouff, Donald A., 4,696,026, Cl. 379-34.000.

General Tire, Inc.: *See*—
Street, Robert W., 4,694,580, Cl. 33-32.600.

Gent, Derek J.; and Bergstrom, Michael, to U.S. Philips Corporation. Line output circuit for generating a line frequency sawtooth current. 4,695,774, Cl. 315-408.000.

Geomation, Inc.: *See*—
Klebba, John M.; and Hultman, Kenneth L., 4,695,920, Cl. 361-118.000.

George Blair P.L.C.: *See*—
Hewitt, Paul, 4,694,556, Cl. 29-451.000.

Georgia-Pacific Corporation: *See*—
Fowler, George F., Jr.; and Lehnert, Charles W., 4,695,494, Cl. 428-71.000.

Georgiev, Georgi A.: *See*—
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.

Gerhart, Fritz; and Mamont, Pierre, to Merrell Dow Pharmaceuticals Inc. Gem-dihalo-1,8-diamino-4-aza-octanes. 4,695,654, Cl. 564-510.000.

Gerloff, Klaus; Ehlert, Dieter; and von der Wall, Klaus, to Continental Gummi-Werke Aktiengesellschaft. Vehicle wheel with run-flat support. 4,694,873, Cl. 152-380.000.

Gerlowski, Thomas J., to Westinghouse Electric Corp. Check valve test method using truncated accumulator blowdown. 4,694,693, Cl. 73-168.000.

Gerwin, Helmut: *See*—
Teuchert, Eberhardt; Haas, Klaus-Arne; and Gerwin, Helmut, 4,695,423, Cl. 376-265.000.

Gibbemeyer, Joseph F., to Cincinnati Milacron Inc. Bottom loader for a conveyor means. 4,694,951, Cl. 198-468.300.

Gibes, Terrence R. Portable radiation contamination detector. 4,695,728, Cl. 250-336.100.

Gibson, Jame D. M., to Wool Development International, Ltd. Fluid dispensing process. 4,695,485, Cl. 427-256.000.

Gibson, Michael A.: *See*—
Stahl, Charles R.; Gibson, Michael A.; and Knudsen, Christian W., 4,694,907, Cl. 166-303.000.

Giehl, Klaus U., to Steinhardt, Lothar. Device for regulating the discharge of fluid from a container. 4,694,854, Cl. 137-519.000.

Gietman, Peter J., Jr., to Custom Machinery Design, Inc. Coreless winder for strips of pliable material. 4,695,005, Cl. 242-56.00R.

Gillingham, Ernest L.: *See—*
Dines, Jack E.; and Gillingham, Ernest L., 4,694,754, Cl. 102-310.000.

Gimesi, Antal: *See—*
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

Giordano, Raymond L., to RCA Corporation. Level shift circuit including source follower output. 4,695,744, Cl. 307-279.000.

Giorgadze, Alexandr K.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Giroux, D. William. Means for pulling fiber optic cable through a conduit. 4,695,038, Cl. 254-134.3FT.

Gist-Brocades N.V.: *See—*
Bos, Jacobus J.; Cuperus, Rinze; and Wielinga, Rudolf, 4,695,628, Cl. 540-312.000.
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.

Givens, Edwin N.: *See—*
Garg, Diwakar; Givens, Edwin N.; and Schweighardt, Frank K., 4,695,369, Cl. 208-112.000.

GKSS Forschungszentrum Geesthacht GmbH: *See—*
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,695,380, Cl. 210-347.000.

Gladwin, Kirk M. Method of continuously casting metal slabs. 4,694,880, Cl. 164-459.000.

Glaser, Donald A., to Glendo Corporation. Controlled impact power tool. 4,694,912, Cl. 173-115.000.

Glaxo Group Limited: *See—*
Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,695,578, Cl. 514-397.000.

Glendo Corporation: *See—*
Glaser, Donald A., 4,694,912, Cl. 173-115.000.

Globus, Alfred R. Ternary alloy and oil slurry thereof. 4,695,400, Cl. 252-309.000.

Gobbi, Alberto: *See—*
Flosi, Corrado; Gobbi, Alberto; Maccioni, Roberto; and Simonetta, Guerrieri, 4,694,505, Cl. 2-2.000.

Godar, Joseph L., to American Can Company. Forming lubricant for a coated metal container and method of making the same. 4,695,492, Cl. 428-35.000.

Goebel, Eickhart, to Gebr. Hofmann GmbH & Co. Kg Maschinenfabrik. Tire-mounting apparatus. 4,694,875, Cl. 157-1.240.

Goel, Anil B., to Ashland Oil, Inc. Sag resistant, high performance epoxy structural adhesives. 4,695,605, Cl. 525-109.000.

Goethel, James H., to Liebel-Flarsheim Company. Angiographic injector. 4,695,271, Cl. 604-49.000.

Goetz, Michael A.: *See —*
Monaghan, Richard L.; Goetz, Michael A.; and Chang, Raymond S., 4,695,544, Cl. 435-119.000.

Goetze AG: *See—*
Brauers, Bert; and Morsbach, Martin, 4,695,064, Cl. 277-139.000.

Gojo, Tomomi; Yagi, Yoshio; and Izumi, Tsunetada, to Ricoh Company, Ltd. Patterned line generator for a data processing device. 4,695,834, Cl. 340-734.000.

Golda, Yackob. Yarn cutting head. 4,694,761, Cl. 112-80.710.

Goldschmidt, Klaus: *See—*
Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, 4,695,444, Cl. 423-569.000.

Golubeva, Diana F.: *See—*
Gendelman, Mikhail A.; Borodulin, Anatoly F.; Golubeva, Diana F.; and Bychkov, Sergei V., 4,694,867, Cl. 139-192.000.

Goodacre, John H.; and Brogren, Eric, to Chevron Research Company. Lip-type sealing system for a removable bottom founded structure. 4,695,198, Cl. 405-224.000.

Goodacre, John H.; and Hall, Larry J., to Chevron Research Company. Elastomeric bearing pad and seal for a removable bottom founded structure. 4,695,199, Cl. 405-224.000.

Goodacre, John H.: *See—*
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.
Hall, Larry; and Goodacre, John H., 4,695,200, Cl. 405-224.000.

Goodale, David L.; and Darden, Nick, to Beckman Instruments, Inc. Rotary pinch valve. 4,694,861, Cl. 137-624.190.

Goode, Richard L.: *See—*
Bruce, Donald; and Goode, Richard L., 4,695,275, Cl. 604-264.000.

Goodman, Howard; and Fugler, Andrew R., to English Clays Lovering Pochin & Company. Granule for separating organic compounds from aqueous liquids. 4,695,511, Cl. 428-404.000.

Goodman, Larry R.: *See—*
Vlakancic, Connor G.; Pereira, Ruy J.; and Goodman, Larry R., 4,694,694, Cl. 73-386.000.

Goodwin, Richard S., to R. Goodwin International Ltd. Wafer check valves. 4,694,853, Cl. 137-512.100.

Gordon, Colin R.: *See—*
Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., 4,695,190, Cl. 405-169.000.

Gordon, Eric M.: *See—*
Varma, Ravi K.; and Gordon, Eric M., 4,695,585, Cl. 514-469.000.
Varma, Ravi K.; Chao, Sam T.; and Gordon, Eric M., 4,695,586, Cl. 514-469.000.

Gordon, Eugene I.; and Levy, Uri, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method of making a semiconductor laser CRT. 4,695,332, Cl. 437-126.000.

Gorman, John P.: *See—*
Covington, Edward J.; Cridland, John E.; and Gorman, John P., 4,695,768, Cl. 315-73.000.

Gorner, Horst; Furstwangler, Walter; and Usbeck, Walter, to Mannesmann Kienzle GmbH. Apparatus for separating documents. 4,695,048, Cl. 271-122.000.

Gorzegno, Walter P.; and Abdulally, Iqbal F., to Foster Wheeler Energy Corporation. Segmented fluidized bed combustion method. 4,694,758, Cl. 110-347.000.

Goto, Giichi; and Saji, Yoshiaki, to Takeda Chemical Industries, Ltd. Isoindolinone derivatives, production and use thereof. 4,695,572, Cl. 514-278.000.

Goto, Yasuyuki; Ogawa, Tetsuya; and Sugimori, Shigeru, to Chisso Corporation. Cyclohexane derivative. 4,695,398, Cl. 252-299.500.

Goudie, Kathleen M., to Texas Instruments Incorporated. Speaking apparatus having differing speech modes for word and phrase synthesis. 4,695,962, Cl. 364-513.500.

Goudie, Kathleen M., to Texas Instruments Incorporated. Syllable boundary recognition from phonological linguistic unit string data. 4,696,042, Cl. 381-51.000.

Grabbe, Dimitry; Korsunsky, Iosif; Klunk, Thomas M.; and DiOrazio, Joseph S., to AMP Incorporated. Zero insertion force connector having wiping action. 4,695,111, Cl. 439-266.000.

Grabitz, Ernst B., to Hasunor A.G. Metabolically active preparations obtained from yeast of any type. 4,695,549, Cl. 435-267.000.

Grace, William G., to Repco Limited. Continuous or semi-continuous process for forming reconsolidated wood product. 4,695,345, Cl. 156-264.000.

Grady, Mark P., to Seatronics, Inc. Oxygen sensor. 4,695,361, Cl. 204-415.000.

Graf, Lothar; Maerte, Leo; and Skorka, Thomas, to Ing. Erich Pfeiffer GmbH & Co. KG. Fluid dispenser. 4,694,977, Cl. 222-259.000.

Grafen, Karl; and Schiffers, Theo, to H. Krantz GmbH & Co. Apparatus for heat treatment of a textile web. 4,694,526, Cl. 15-306.00A.

Graham, Randall C., to Essex Group, Inc. Wire runtogether sensor. 4,695,830, Cl. 340-677.000.

Gramer, Josef: *See—*
Dreher, Anton; and Gramer, Josef, 4,695,001, Cl. 242-25.00R.

Granat, Rodney J., to ACI Australia Limited. Container closure. 4,694,969, Cl. 215-252.000.

Grand Junction Reality Co., Inc.: *See—*
Anthony, Myron L., 4,695,448, Cl. 423-659.000.

Granryd, Thorvald G. High performance drive tire arrangement for agricultural tractors. 4,694,872, Cl. 152-216.000.

Grant, Robert W., to FSI Corporation. Flow regulating valve for controlling the flow of corrosive fluids. 4,694,852, Cl. 137-501.000.

Gras-Masse, Helene: *See—*
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.

Grawey, Charles E.; and Winters, Scot L., to Caterpillar Inc. Method of forming a windowed unitary panel. 4,695,420, Cl. 264-265.000.

Gray, George W.: *See—*
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

Gray, Robert R. Pulse combustion drying apparatus for particulate materials. 4,695,248, Cl. 432-58.000.

Gray, Robert R. Feed system for particle drying pulse jet combustors. 4,695,249, Cl. 432-58.000.

Graziani, Kenneth R.; Kyan, Chwan P.; Shih, Stuart S.; and Sowiak, Raymond M., to Mobil Oil Corporation. Lube or light distillate hydrodewaxing method and apparatus with light product removal and enhanced lube yields. 4,695,364, Cl. 208-59.000.

Greatrake, Scott E.: *See—*
Faulconer, Mark; and Greatrake, Scott E., 4,694,772, Cl. 114-315.000.

Grebinski, Thomas J., to Purusar Corporation. Surface treatment to remove impurities in microrecesses. 4,695,327, Cl. 134-11.000.

Green, Joseph H., to Greenco Corporation. Cable shield for a rodless cylinder. 4,694,733, Cl. 92-88.000.

Greenawalt, Kent S. Arch support unit and method of formation. 4,694,590, Cl. 36-91.000.

Greenberg, Robert, to Ray Industries, Inc. Marine propeller shaft/key assembly. 4,695,183, Cl. 403-356.000.

Greenco Corporation: *See—*
Green, Joseph H., 4,694,733, Cl. 92-88.000.

Greene, Joe A. Printing press cylinder with axially adjustable cord anti-smear devices. 4,694,750, Cl. 101-426.000.

Gregory Enterprises, Inc.: *See—*
Gregory, Steven D., 4,695,203, Cl. 405-230.000.

Gregory, Steven D. Foundation filing system. 4,694,625, Cl. 52-294.000.

Gregory, Steven D., to Gregory Enterprises, Inc. Method and apparatus for shoring and supporting a building foundation. 4,695,203, Cl. 405-230.000.

Grellmann, Heinz E.; and Roland, Leonard A., to Tektronix, Inc. High frequency coaxial switch. 4,695,811, Cl. 333-105.000.

Grenzicki, Lawrence B. Heavy duty display cart. 4,694,923, Cl. 180-6.500.

Griffin, Everett, to Burlington Industries, Inc. Horizontal bundling with variable entry and exit conveyors. 4,694,636, Cl. 53-399.000.

Grimm, Daniel: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, to Foster Wheeler Energy Corporation. Method of manufacturing sulphur from SO2 containing gases. 4,695,444, Cl. 423-569.000.

Groff, Horace E. Method and apparatus for frying product. 4,694,743, Cl. 99-405.000.

Grohe, Klaus: *See—*
Maurer, Fritz; and Grohe, Klaus, 4,695,646, Cl. 560-43.000.

Groman, Ernest V.: *See—*
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,392, Cl. 252-62.540.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,393, Cl. 252-62.540.

Grootveld, Herman H.: *See—*
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.

Grosse, Joachim; Hess, Ruediger; Kuhl, Wilfried; and Mueller, Reiner, to Siemens Aktiengesellschaft. Contact arrangement for vacuum switches with axial magnetic field, and method for the production of the respective contact pieces. 4,695,687, Cl. 200-144.00B.

Grossman, Hyman: *See—*
Coville, William E.; Grossman, Hyman; and Sokol, Michael, 4,695,430, Cl. 422-65.000.

Grossmann, Udo; Holzinger, Dieter; and Rohde, Guenter, to J. M. Voith GmbH. Method for transferring a web from a finished roll to a new core, and drum winder for the application of the method. 4,695,004, Cl. 242-56.00R.

Grove, Jerry E. Snap fastener tool. 4,694,550, Cl. 29-267.000.

Gruber, Robert J.: *See—*
Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., 4,695,524, Cl. 430-32.000.

Grubman, Moe M. Non-pucker necktie. 4,694,509, Cl. 2-144.000.

Gruzinsky Politekhnichesky Institute: *See—*
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.

GTE Products Corporation: *See—*
DeNuccio, Ron J.; Kim, Han J.; and Leung, Chi H., 4,694,558, Cl. 29-527.200.
Ritsko, Joseph E.; Houck, David L.; and Acla, Howard L. R., 4,695,439, Cl. 423-263.000.
Schulze, Harry O.; and Karam, Ronald E., 4,695,478, Cl. 427-71.000.
Wierzbicki, Julian J.; and Chakrabarti, Kirti B., 4,695,930, Cl. 362-293.000.

Gugel, Bernd; Niebel, Harald; and Ott, Hubert, to Mannesmann Aktiengesellschaft. Magnetic circuit for matrix print head. 4,695,174, Cl. 400-124.000.

Guha, Subhendu; and Agarwal, Satish, to Energy Conversion Devices, Inc. Thin film light emitting diode, photonic circuit employing said diode imager employing said circuits. 4,695,859, Cl. 357-19.000.

Guibet, Jean-Claude: *See—*
Stern, Robert; Hillion, Gerard; Gateau, Paul; and Guibet, Jean-Claude, 4,695,411, Cl. 260-410.90R.

Gunther International, Ltd.: *See—*
Gunther, William H., Jr., 4,694,631, Cl. 53-55.000.
Gunther, William H., Jr., 4,694,632, Cl. 53-55.000.

Gunther, William H., Jr., to Gunther International, Ltd. Mechanism for folding an envelope around an insert. 4,694,631, Cl. 53-55.000.

Gunther, William H., Jr., to Gunther International, Ltd. Mechanism for folding an envelope around an insert. 4,694,632, Cl. 53-55.000.

Guyader, Jean: *See—*
Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, 4,695,432, Cl. 422-98.000.

GV Medical, Inc.: *See—*
Kosa, Nadhir B., 4,695,697, Cl. 219-121.0LZ.

H. Krantz GmbH & Co.: *See—*
Grafen, Karl; and Schiffers, Theo, 4,694,526, Cl. 15-306.00A.

Haas, Franz, Jr.: *See—*
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,694,741, Cl. 99-354.000.

Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, to Franz Haas Waffelmaschinen Industriegesellschaft m.b.H. Apparatus for making rolled wafer cones. 4,694,741, Cl. 99-354.000.

Haas, Johann: *See—*
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,694,741, Cl. 99-354.000.

Haas, Klaus-Arne: *See—*
Teuchert, Eberhardt; Haas, Klaus-Arne; and Gerwin, Helmut, 4,695,423, Cl. 376-265.000.

Haas, Peter, to Bayer Aktiengesellschaft. Cycloacetals. 4,695,630, Cl. 544-75.000.

Hackleman, David E.; Bearss, James G.; and Bhaskar, Eldurkar V., to Hewlett-Packard Company. Thin film vertical resistor devices for a thermal ink jet printhead and methods of manufacture. 4,695,853, Cl. 346-140.00R.

Hackler, Erich: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Hadbavny, David L. Lifting apparatus. 4,695,037, Cl. 254-131.000.

Haffer, Gregor: *See—*
Sauer, Gerhard; and Haffer, Gregor, 4,695,635, Cl. 546-69.000.

Haga, Noriyuki: *See—*
Kawamata, Yuuji; Iino, Tomohiko; Suzuki, Ryoichi; and Haga, Noriyuki, 4,695,481, Cl. 427-96.000.

Hagan, Richard J., to McKesson Corporation. Method and apparatus for storing and dispensing fluids containered under gas pressure. 4,694,975, Cl. 222-1.000.

Hagmann, Peter: *See—*
Ehrfeld, Wolfgang; and Hagmann, Peter, 4,694,548, Cl. 29-157.00C.

Haiduk, Klaus, to Klockner-Humboldt-Deutz AG. Hollow core molding apparatus. 4,694,883, Cl. 164-186.000.

Hakoun, Roland; and Jurczyszyn, Michel, to Optiques Compagnie Lyonnaise de Tranmissions. Automatic machine for welding two optical fibers end-to-end. 4,695,306, Cl. 65-152.000.

Hall, Antony H. P.; and McCarroll, John J., to British Petroleum Company p.l.c., The. Production of aromatics from hydrocarbon feedstock. 4,695,663, Cl. 585-417.000.

Hall, Arthur B., to TP Orthodontics, Inc. Method of making an optically clear tooth positioning and retaining appliance. 4,695,417, Cl. 264-80.000.

Hall, David A.; and Yuergens, Kenneth C., to Borg-Warner Automotive, Inc. Drive hub for torque converter clutch. 4,694,941, Cl. 192-3.280.

Hall, David R., to Smith International, Inc. Rock bit with diamond tip inserts. 4,694,918, Cl. 175-329.000.

Hall, James R., to Rockwell International Corporation. Electromagnetic launcher assembly. 4,694,729, Cl. 89-8.000.

Hall, Larry; and Goodacre, John H., to Chevron Research Company. Membrane seal for a removable bottom founded structure. 4,695,200, Cl. 405-224.000.

Hall, Larry J.: *See—*
Beskow, Robert H.; Dunn, Patrick J.; Goodacre, John H.; Hall, Larry J.; Fischer, William H.; and Carlson, E. Ronald, 4,695,201, Cl. 405-224.000.
Goodacre, John H.; and Hall, Larry J., 4,695,199, Cl. 405-224.000.

Hallay, Alexander R., to Advance Transformer Company. Ignition circuit for high pressure arc discharge lamps. 4,695,771, Cl. 315-290.000.

Halliburton Company: *See—*
Ringgenberg, Paul D., 4,694,903, Cl. 166-250.000.

Halpern, Yuval, to Borg-Warner Chemicals, Inc. Polyphenylene ether thermoplastic protected from discoloration during processing. 4,695,601, Cl. 524-362.000.

Halton Oy: *See—*
Aalto, Erkki; and Yla-Hemmila, Veikko, 4,694,851, Cl. 137-499.000.

Halushka, Perry V.: *See—*
Eller, Thomas D.; Halushka, Perry V.; Knapp, Daniel R.; and Mais, Dale, 4,695,647, Cl. 560-53.000.

Hamada, Tetsuro: *See—*
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,695,068, Cl. 280-91.000.

Hamaguri, Kenji, to Minolta Camera Kabushiki Kaisha. Noninvasive device for photoelectrically measuring the property of arterial blood. 4,694,833, Cl. 128-633.000.

Hamai, Kyugo, to Nissan Motor Company, Limited. Fuel supply system for internal combustion engine. 4,694,797, Cl. 123-339.000.

Hamanaka, Tadashi: *See—*
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.

Hamermesh, Charles L.; Dynes, Paul J.; and Hogenson, Peter A., to Rockwell International Corporation. Intumescent flame-resistant coating composition. 4,695,619, Cl. 528-73.000.

Hammack, Milton E.: *See—*
Vondergoltz, G. Earl; and Hammack, Milton E., 4,694,628, Cl. 52-528.000.

Hammer, Ludwig: *See—*
Faust, Eberhard; Niethammer, Kurt; and Hammer, Ludwig, 4,695,095, Cl. 297-410.000.

Hammond, Martin L.; and Ramiller, Charles L., to Tetron, Inc. Reactor apparatus for semiconductor wafer processing. 4,694,779, Cl. 118-730.000.

Hampel, Wilbur J.: *See—*
Comer, Robert C.; Hampel, Wilbur J.; and Rogers, Edward A., 4,694,528, Cl. 15-330.000.

Hamu, Kaino J. Silkscreen frame mounting assembly for press. 4,694,746, Cl. 101-124.000.

Hanada, Toshiro: *See—*
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.

Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,540, Cl. 435-10.000.

Hane, Fuyuki: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.

Hane, Toshiyuki, to NSK-Warner K.K. Position adjusting device for movable anchor latch mechanism. 4,695,076, Cl. 280-804.000.

Hanna, Gayda; and Vadino, Winston A., to Schering Corporation. Controlled release dosage forms comprising hydroxypropylmethylcellulose. 4,695,591, Cl. 514-781.000.

Hannah, John; and Christensen, Burton G., to Merck & Co., Inc. Antibacterial 7β-heterocyclic-cephem. 4,695,565, Cl. 514-206.000.

Hansen, Jens O. E., to Koagskilde Koncernselskab A/S. Pneumatic conveyor for particulate material. 4,695,206, Cl. 406-65.000.

Hansen, Terris L.; Hyatt, Wayne E.; and Leung, Wu-Hon F., to American Telephone and Telegraph Company and AT&T Bell Laboratories. Control of real-time systems utilizing a nonprocedural language. 4,695,977, Cl. 364-900.000.

Hanson, Daniel R.; and Nesheim, Ludwig D., to Cherne Industries, Inc. Connector assembly for electrically connecting flexible and rigid printed circuits. 4,695,258, Cl. 439-67.000.

Hantschk, Gunther, to Netzsch-Mohnopumpen GmbH. Erecting rig for a well pump. 4,695,040, Cl. 254-264.000.

Hara, Hiroyuki; Nakamura, Michinori; and Sugimoto, Yasuhiro, to Kabushiki Kaisha Toshiba. Voltage level converting circuit. 4,695,750, Cl. 307-475.000.

Harara, Mitsuhiko: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Hardy, Christopher J.; and Edelstein, William A., to General Electric Company. NMR magnetization inversion by non-linear adiabatic fast passage. 4,695,799, Cl. 324-307.000.

Harms, Daryl E.: *See*—
Johnson, Terry W.; Harms, Daryl E.; and Curl, Ricky L., 4,695,880, Cl. 358-86.000.

Harner, Kermit I.: *See*—
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., 4,695,736, Cl. 290-44.000.

Harnisch, Horst; and Siegel, Edgar, deceased (by Gabriele, E. Helena-Maria Siegel, heiress), to Bayer Aktiengesellschaft. Process for quenching fluorescence, and new cationic or amphoteric aromatic nitro compounds. 4,695,405, Cl. 252-600.000.

Haro, Rudy: *See*—
Rabon, Joe D.; and Haro, Rudy, 4,695,737, Cl. 307-31.000.

Harold A. Williamson: *See*—
Holt, David R., 4,695,142, Cl. 354-76.000.

Harold R. Lauterbach: *See*—
Woods, James A., 4,694,679, Cl. 73-1.00R.

Harris Corporation: *See*—
Heckaman, Douglas E.; Higman, Roger H.; Frisco, Jeffrey A.; and Bajgrowicz, Edward J., 4,695,810, Cl. 333-1.000.

Harris, Robert S., to Stant Inc. Fuel sender unit. 4,694,857, Cl. 137-565.000.

Harris, Stephen J.: *See*—
Leonard, Raymond G.; and Harris, Stephen J., 4,695,615, Cl. 526-194.000.

Harshaw, Robert C., to Texas Instruments Incorporated. Tunable multiline/multiband laser. 4,696,012, Cl. 372-99.000.

Hart, James B.: *See*—
Kitner, William M.; and Hart, James B., 4,694,770, Cl. 114-123.000.

Hart, Robert D.; and Ambrozaitis, John J., to Minelco, Inc. Electromagnetic flip-type visual indicator. 4,694,599, Cl. 40-449.000.

Harter, Karl: *See*—
Volk, Heinrich; Harter, Karl; and Dotter, Fritz, 4,694,745, Cl. 101-111.000.

Hartmann, Dirck T. Single speed transmission for pedal-propelled vehicle. 4,694,708, Cl. 74-750.00B.

Haruta, Masahiro: *See*—
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, 4,695,717, Cl. 250-213.00R.

Harvey Hubbell Incorporated: *See*—
Rue, Robert H., 4,695,803, Cl. 324-403.000.

Hasegawa, Yukio: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Hashima, Akio: *See*—
Honjo, Masahiro; and Hashima, Akio, 4,695,900, Cl. 358-310.000.

Hashimoto, Akio: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.

Hashimoto, Minoru; Takeuchi, Hajime; and Itoh, Takeo, to Kabushiki Kaisha Toshiba. Magnetic recording medium. 4,695,513, Cl. 428-425.900.

Hashimoto, Toshie: *See*—
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.

Hasunor A.G.: *See*—
Grabitz, Ernst B., 4,695,549, Cl. 435-267.000.

Hata, Takehisa: *See*—
Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, 4,695,466, Cl. 424-456.000.

Hatanai, Takashi; and Nakashima, Keishi, to Alps Electric Co., Ltd. Magnetic head for perpendicular magnetic recording. 4,695,512, Cl. 428-408.000.

Hatta, Koichi: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.
Oda, Koichi; Hatta, Koichi; and Sumitani, Toshihiko, 4,695,983, Cl. 364-709.000.

Hattori, Hiroshi: *See*—
Ueno, Hideo; Hattori, Hiroshi; Maeda, Kumiko; and Yamada, Keiko, 4,695,172, Cl. 400-83.000.

Hattori, Isao; and Noiri, Hifuo, to NGK Insulators, Ltd. Plunger molding machine having blank loading device. 4,695,242, Cl. 425-376.00R.

Hattori, Tadashi: *See*—
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.

Haupt, Eberhard: *See*—
Altmann, Horst-Dieter; and Haupt, Eberhard, 4,695,091, Cl. 297-180.000.

Haven, Kenneth R., to Attain, Inc. Test system manipulator arm. 4,695,024, Cl. 248-281.100.

Haverberg Auto Laundry Equipment Company: *See*—
Van Brakel, Russel A., 4,694,523, Cl. 15-53.00B.

Hawkins, Richard A.; and Hunter, Merle D., to City of Columbus, Ohio, The. Tuyere construction for refuse burning boiler systems. 4,694,757, Cl. 110-271.000.

Hayase, Yoshio; Ohtsuka, Toshikazu; Ide, Kinya; and Takahashi, Toshio, to Shionogi & Co., Ltd. 4,5,6,7-tetrahydro-2H-indazole derivatives and herbicides containing them. 4,695,312, Cl. 71-92.000.

Hayashi, Souichi; Miyake, Johji; Koyama, Mototsugu; and Sakaguchi, Kanji, to Toyota Jidosha Kabushiki Kaisha. Method for manufacturing a cylinder head of cast aluminum alloy for internal combustion engines by employing local heat treatment. 4,695,329, Cl. 148-3.000.

Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Braking device for vehicle. 4,694,938, Cl. 188-181.00A.

Hayashida, Shigeru: *See*—
Kigasawa, Kazuo; Ohtani, Hideaki; Tanaka, Makoto; and Hayashida, Shigeru, 4,695,465, Cl. 424-449.000.

Hayes, Thomas H., to Anchor Hocking Corporation. Tamper evident composite closure. 4,694,970, Cl. 215-252.000.

Haze, Setsuo: *See*—
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.

Hazelett Strip-Casting Corporation: *See*—
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.

Head, Robert E.; and Yao, Samuel S., to Hughes Helicopters Inc. All composite, constant speed universal joint for use in a shaft driven tiltable main rotor for a helicopter. 4,695,227, Cl. 416-134.00A.

Healy, Henry S.: *See*—
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., 4,695,736, Cl. 290-44.000.

Heather, James B.; and Milano, Pamela D., to Stauffer Chemical Company. Process for the production of acylated 1,3-dicarbonyl compounds. 4,695,673, Cl. 568-310.000.

Heck, Michael; and Singer, Nathan. Escapement apparatus for an automatic screw feeding machine. 4,694,974, Cl. 221-263.000.

Heckaman, Douglas E.; Higman, Roger H.; Frisco, Jeffrey A.; and Bajgrowicz, Edward J., to Harris Corporation. Waffleline-configured microwave transmission link. 4,695,810, Cl. 333-1.000.

Hedden, Richard L.: *See*—
Bagby, John P.; and Hedden, Richard L., 4,695,139, Cl. 350-620.000.

Hedrick, Ross M.: *See*—
Mottus, Edward H.; and Hedrick, Ross M., 4,695,611, Cl. 525-432.000.

Hedrick, Stephen L.: *See*—
Schoenbaum, Gary L.; Latanzi, Lewis A.; Hedrick, Stephen L.; and Johnson, Harold V., 4,695,157, Cl. 356-237.000.

Hefner, Robert E.: *See*—
Barton, James C.; Hefner, Robert E.; Reid, Paul A.; and Sable, Frank R., 4,694,928, Cl. 180-268.000.

Hefti, Walter: *See*—
Fretz, Walter; and Hefti, Walter, 4,695,000, Cl. 242-18.0DD.

Heideman, Robert J.; and Mitera, Richard T., to Enertrols, Inc. Shock absorber with stop collar. 4,694,939, Cl. 188-287.000.

Heidemann, Gerhard; and Witte, Johannes, to Eastman Christensen Co. Mechanical jarring devices for use in drilling. 4,694,917, Cl. 175-299.000.

Heikkila, Kurt E.; Williams, Rodney K.; and Pylkki, Russell J., to ETD Technology, Inc. Analysis of organic additives in plating baths using novel chromatographic methods in a mass balance approach. 4,694,682, Cl. 73-61.10C.

Heilweil, I. J.: *See*—
Derouane, E. G.; Dessau, R. M.; Heilweil, I. J.; and Kerr, G. T., 4,695,642, Cl. 556-14.000.

Hein, Arthur G. Electrostatic precipitator. 4,695,297, Cl. 55-112.000.

Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, to Kali-Chemie Pharma GmbH. 3-aminocarbonylmethoxy-5-phenylpyrazole compounds, antiarrythmic compo-

sitions containing them, and intermediates in their preparation. 4,695,566, Cl. 514-234.000.
Heinrich, William P.; and Leopoldi, Norbert, to Genentech, Inc. Height-measuring device. 4,694,581, Cl. 33-169.00R.
Heinz, Robert: *See*—
Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, 4,695,397, Cl. 252-182.000.
Hellat, Jaan; and Keller, Jakob, to BBC Brown, Boveri & Company, Limited. Axial swirl body for generating rotary flows. 4,695,225, Cl. 415-189.000.
Hellgren, Lars G. I.; Mohr, Viggo; and Vincent, Jan G., to Pharmacia AB. Enzyme composition acting as a digestion promoter on various levels in the alimentary tract, and a method for facilitating digestion. 4,695,457, Cl. 424-94.000.
Helzel, Thomas: *See*—
Buikman, Dirk; Helzel, Thomas; and Roschman, Peter, 4,694,836, Cl. 128-653.000.
Henderson, Steven: *See*—
Spenceley, Gene D.; and Henderson, Steven, 4,694,889, Cl. 164-488.000.
Henkel Corporation: *See*—
Tuominen, Francis W.; Maier, Helmut K.; and Howland, Warren W., 4,695,453, Cl. 424-81.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.
Rossmann, Christian; Fluechter, Horst; Schreiber, Gerald; and Wichelhaus, Winfried, 4,695,396, Cl. 252-135.000.
Henne, Heinrich; Blasczyk, Gotthardt; Eickholt, Hubert; and Lohnherr, Ludger, to Krupp Polysius AG. Roller mill. 4,694,994, Cl. 241-79.100.
Henniger, Peter W.: *See*—
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.
Hens, Jozef E.: *See*—
Janssens, Frans E.; Torremans, Joseph L. G.; Hens, Jozef E.; and Van Offenwert, Theophilus T. J. M., 4,695,569, Cl. 514-258.000.
Hens, Jozef F.: *See*—
Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,695,575, Cl. 514-322.000.
Henson, Robert M.: *See*—
Ballentine, Richard E.; and Henson, Robert M., 4,695,428, Cl. 420-561.000.
Hepburn, James; and Malashenko, Leon, to John T. Hepburn, Limited. Hydraulic press without conventional side slabs and cross-head. 4,694,744, Cl. 100-214.000.
Herb, Phillip: *See*—
Strauss, Richard F.; Herb, Phillip; Noorily, Peter; and Rodrigues, Julio, 4,695,679, Cl. 174-117.0FF.
Herben, William C.: *See*—
McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., 4,694,913, Cl. 175-61.000.
Hergeth Hollingsworth GmbH: *See*—
Pinto, Akiva; and Lucassen, Guenter, 4,694,538, Cl. 19-105.000.
Hermann Hemschedit Maschinenfabrik GmbH & Co.: *See*—
Krieger, Karl; and Reinelt, Werner, 4,694,730, Cl. 91-170.0MP.
Herrell, John M. Tooth replacement. 4,695,254, Cl. 433-213.000.
Herrmann, Gero, to Dyckerhoff & Widmann Aktiengesellschaft. Closed ring-shaped reinforcing member for a concrete structure. 4,694,623, Cl. 52-223.00L.
Herrmeyer, Dennis C., to Rigid Form, Inc. Latch for pickup truck cover doors and the like. 4,695,083, Cl. 292-241.000.
Herz, Arthur H.: *See*—
Bryan, Philip S.; and Herz, Arthur H., 4,695,534, Cl. 430-569.000.
Bryan, Philip S.; and Herz, Arthur H., 4,695,535, Cl. 430-569.000.
Herzenberg, Leonard A.: *See*—
Steinman, Lawrence; Waldor, Matthew K.; Sriram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., 4,695,459, Cl. 424-95.000.
Herzenberg, Leonore A.: *See*—
Steinman, Lawrence; Waldor, Matthew K.; Sriram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., 4,695,459, Cl. 424-95.000.
Hess, Ruediger: *See*—
Grosse, Joachim; Hess, Ruediger; Kuhl, Wilfried; and Mueller, Reiner, 4,695,687, Cl. 200-144.00B.
Hettche, Albert: *See*—
Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, 4,695,397, Cl. 252-182.000.
Hewitt, Paul, to George Blair P.L.C. Track tread. 4,694,556, Cl. 29-451.000.
Hewlett-Packard Company: *See*—
Hackleman, David E.; Bearss, James G.; and Bhaskar, Eldurkar V., 4,695,853, Cl. 346-140.00R.
Miller, Robert V., 4,695,791, Cl. 324-78.00D.
Sikich, Joseph P.; and Duncombe, Richard R., 4,695,981, Cl. 365-227.000.
Higashino, Shigenori, to Mitsubishi Denki Kabushiki Kaisha. Superconductive energy storage circuit. 4,695,932, Cl. 363-14.000.
Hight, Andrew T., to Lever Brothers Company. Cool water fabric washing process using a particulate detergent containing a nonionic and a fatty acid builder salt. 4,695,284, Cl. 8-137.000.
Higman, Roger H.: *See*—
Heckaman, Douglas E.; Higman, Roger H.; Frisco, Jeffrey A.; and Bajgrowicz, Edward J., 4,695,810, Cl. 333-1.000.
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, to Ajinomoto Co., Inc. Biphenyl-based diester compounds and liquid crystal compositions containing same. 4,695,651, Cl. 560-141.000.
Hildt, Earl H. Theft-detection wafer attachment system including shield member. 4,695,845, Cl. 343-873.000.
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, to GKSS Forschungszentrum Geesthacht GmbH. Diaphragm-equipped fluid treating apparatus. 4,695,380, Cl. 210-347.000.
Hill, James D.; and Wooden, Gene R., to Fusion Systems Corporation. Structure for minimizing microwave leakage. 4,695,694, Cl. 219-10.55D.
Hilliard, Jeffrey L.; and Moloney, Maurice M., to Hilliard, Jeffrey L. Probe for electrofusion, electroporation, or like procedure. 4,695,547, Cl. 435-173.000.
Hillion, Gerard: *See*—
Stern, Robert; Hillion, Gerard; Gateau, Paul; and Guibet, Jean-Claude, 4,695,411, Cl. 260-410.90R.
Hilson, Carol A.: *See*—
Estes, Donna L.; and Hilson, Carol A., 4,694,511, Cl. 2-69.000.
Himono, Yusaku; Moriya, Yoshiaki; Miyahara, Masato; and Suzuki, Kazuhiro, to Furukawa Electric Co., Ltd., The. Plastic optical fiber cable with ferrule. 4,695,124, Cl. 350-96.200.
Hinchman, Steven B.: *See*—
Sengul, M. Marc; and Hinchman, Steven B., 4,694,904, Cl. 166-252.000.
Hirai, Masaru: *See*—
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,695,488, Cl. 427-385.500.
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, to Canon Kabushiki Kaisha. Semi-conductor device and electronic apparatus using the same. 4,695,717, Cl. 250-213.00R.
Hiraka, Masahiro: *See*—
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Hiraka, Masahiro, 4,694,573, Cl. 29-846.000.
Hirano, Yoshinori; and Kubozuka, Takao, to Nissan Motor Co., Ltd. Cooling system for automotive engine or the like. 4,694,784, Cl. 123-41.120.
Hirasawa, Masahide: *See*—
Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, 4,696,008, Cl. 371-47.000.
Hirata, Atsumi: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.
Hirata, Yoshiaki: *See*—
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, 4,695,235, Cl. 425-29.000.
Hirokane, Junji: *See*—
Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, 4,695,514, Cl. 428-432.000.
Hirosawa, Yoshiaki: *See*—
Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; and Fujii, Isao, 4,694,799, Cl. 123-425.000.
Hirose, Michio: *See*—
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Hirota, Yuichi: *See*—
Takeuchi, Yasuhito; Hirota, Yuichi; Sano, Shinichi; and Ishiguro, Shinichi, 4,694,680, Cl. 73-1.0DV.
Hirs, Henri G. J.: *See*—
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.
Hirt, Adam: *See*—
Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, 4,694,814, Cl. 123-644.000.
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, to Daikin Industries, Ltd. Soil release composition and use thereof. 4,69[illegible]88, Cl. 427-385.500.
Hitachi Construction Machinery Co.: *See*—
Ogura, Yukio; and Nasu, Seiji, 4,695,833, Cl. 340-722.000.
Hitachi Construction Machinery Co., Ltd.: *See*—
Miyajima, Takeshi, 4,694,698, Cl. 73-570.000.
Hitachi Engineering Co., Ltd.: *See*—
Ogura, Yukio; and Nasu, Seiji, 4,695,833, Cl. 340-722.000.
Hitachi, Ltd.: *See*—
Aoyama, Motoo; Maruyama, Hiromi; Umegaki, Kikuo; and Uchikawa, Sadao, 4,695,425, Cl. 376-435.000.
Ikeda, Koichi; Nakamura, Kozi; and Okabe, Toshihiro, 4,695,947, Cl. 364-200.000.
Ishida, Koji; and Matumura, Hiroyoshi, 4,695,122, Cl. 350-96.120.
Kawamoto, Hiroshi, 4,695,864, Cl. 357-41.000.
Kurosawa, Yukio; and Iwashita, Kiyoji, 4,695,689, Cl. 200-144.00B.
Momata, Kazuhiro; Dekura, Yoshinori; Honzawa, Tadashi; and Matsushige, Hiromi, 4,695,909, Cl. 360-122.000.

Seto, Youichi; Homma, Koichi; Komura, Fuminobu; and Ota, Hideo, 4,695,964, Cl. 364-518.000.
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syoichi, 4,694,688, Cl. 73-116.000.
Warabisako, Terunori; Ohkura, Makoto; and Miyao, Masanobu, 4,695,856, Cl. 357-4.000.
Hitachi Maxell, Ltd.: *See*—
Maruyama, Hiroshi; Mizushima, Kunio; Sakemoto, Akito; and Umebayashi, Nobuhiro, 4,695,910, Cl. 360-133.000.
Hitachi Zosen Corporation: *See*—
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.
Sakaguchi, Haruo, 4,694,886, Cl. 164-416.000.
Hittie, Debra A. Padded infant seat liner. 4,695,092, Cl. 297-230.000.
Hlavach, Mark C., to Chrysler Motors Corporation. Movable molding for a vehicle. 4,695,084, Cl. 293-126.000.
Ho, Phillman N., to Union Oil Company of California. Extraction of hydrocarbon-containing solids. 4,695,373, Cl. 208-428.000.
Hochiki Corporation: *See*—
Honma, Hiroshi; and Narumiya, Junichi, 4,695,734, Cl. 250-573.000.
Hodge, Allan M. Permanent padlock-chain assembly. 4,694,667, Cl. 70-49.000.
Hoechst Aktiengesellschaft: *See*—
Clauss, Karl; Linkies, Adolf; and Reuschling, Dieter, 4,695,629, Cl. 544-2.000.
Geissler, Ulrich; and Lampas, Heide, 4,695,527, Cl. 430-256.000.
Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Kosley, Raymond W., Jr.; and Cherill, Robert J., 4,695,637, Cl. 546-207.000.
Shutske, Gregory M.; and Pierrat, Frank A., 4,695,573, Cl. 514-290.000.
Hoffmann, Helmuth, to Hydrotechnik GmbH. Measuring turbine. 4,694,681, Cl. 73-3.000.
Hogenson, Peter A.: *See*—
Hamermesh, Charles L.; Dynes, Paul J.; and Hogenson, Peter A., 4,695,619, Cl. 528-73.000.
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, to Kabushikikaisha Tokyo Keiki. Vibration-type gyro apparatus. 4,694,696, Cl. 73-497.000.
Holck, Jens-Peter: *See*—
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.
Holder, James D., to United States of America, Army. Optic-coupled integrated circuits. 4,695,120, Cl. 350-96.110.
Hollrock Engineering, Inc.: *See*—
Hollrock, J. Richard, 4,695,087, Cl. 296-14.000.
Hollrock, J. Richard, to Hollrock Engineering, Inc. Convertible truck bed for pickup. 4,695,087, Cl. 296-14.000.
Holmberg, Erne L.; and Andersson, Torbjorn C., to Aktiebolaget Iggesunds Bruk. Device in connection with choppers. 4,694,995, Cl. 241-92.000.
Holme, Stein, to American Red Cross. Synthetic, plasma-free, transfusible platelet storage medium. 4,695,460, Cl. 424-101.000.
Holmstrom, Robert P. Exhaust port equalizer device. 4,694,646, Cl. 60-272.000.
Holt, David R., to Harold A. Williamson. Automatic photo imaging system. 4,695,142, Cl. 354-76.000.
Holzinger, Dieter: *See*—
Grossmann, Udo; Holzinger, Dieter; and Rohde, Guenter, 4,695,004, Cl. 242-56.00R.
Homann, Walter K.; and Fischer, Lothar, to Huls Aktiengesellschaft. Catalytic system and a process for preparing alpha, omega-C_4 through C_{30} alkenols. 4,695,661, Cl. 568-903.000.
Homeyer, Bernhard: *See*—
Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, 4,695,563, Cl. 514-105.000.
Homma, Koichi: *See*—
Seto, Youichi; Homma, Koichi; Komura, Fuminobu; and Ota, Hideo, 4,695,964, Cl. 364-518.000.
Honda Giken Kogyo K.K.: *See*—
Yatabe, Fumio; and Wazaki, Yoshio, 4,694,805, Cl. 123-489.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.
Asakura, Toshimitsu; and Tagami, Tomoyuki, 4,694,924, Cl. 180-68.300.
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,694,938, Cl. 188-181.00A.
Kamiji, Koichi; and Ohya, Toshikazu, 4,695,075, Cl. 280-735.000.
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,695,068, Cl. 280-91.000.
Ogano, Takeo; Komatsuzaki, Takeshi; Shigenari, Ryoichi; and Uesugi, Naomoto, 4,694,942, Cl. 192-13.00A.
Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; and Fujii, Isao, 4,694,799, Cl. 123-425.000.
Honeywell Bull Inc.: *See*—
Hooker, Lane K.; Howell, Thomas H.; and Ferrell, Charles W., 4,695,951, Cl. 364-200.000.
Honeywell B.V.: *See*—
Berkhof, Hendrikus, 4,695,052, Cl. 237-8.00R.
Honeywell Inc.: *See*—
Egli, Werner H., 4,695,160, Cl. 356-350.000.
Jatnieks, Girts U., 4,695,782, Cl. 318-748.000.
Lees, David E. B.; and Merchant, John, 4,695,959, Cl. 364-458.000.
Levine, Michael R.; Russo, James T.; Cairo, Anthony C.; and Rigotti, Victor H., 4,695,942, Cl. 364-188.000.
Paine, Christopher G.; White, William J.; and Resnick, Susan J., 4,695,861, Cl. 357-30.000.
Wilwerding, Dennis J., 4,695,719, Cl. 250-216.000.
Honeywell Information Systems Inc.: *See*—
Abraham, Ronald F., 4,695,923, Cl. 361-361.000.
Keeley, James W.; and Joyce, Thomas F., 4,695,943, Cl. 364-200.000.
Honguu, Kazuoki: *See*—
Sawamura, Mitsuharu; Honguu, Kazuoki; and Kikuchi, Kazuhiko, 4,695,510, Cl. 428-336.000.
Honjo, Masahiro; and Hashima, Akio, to Matsushita Electric Industrial Co., Ltd. Magnetic recording and playback apparatus for teletext signals. 4,695,900, Cl. 358-310.000.
Honma, Hiroshi; and Narumiya, Junichi, to Hochiki Corporation. Photoelectric smoke sensor including a photosensing data correction ratio correction circuit. 4,695,734, Cl. 250-573.000.
Honmoh, Masao: *See*—
Ogasawara, Toshitaka; Nohmi, Kazumasa; Honmoh, Masao; and Iseki, Yukito, 4,695,763, Cl. 313-487.000.
Honzawa, Tadashi: *See*—
Momata, Kazuhiro; Dekura, Yoshinori; Honzawa, Tadashi; and Matsushige, Hiromi, 4,695,909, Cl. 360-122.000.
Hooker, Lane K.; Howell, Thomas H.; and Ferrell, Charles W., to Honeywell Bull Inc. Computer hierarchy control. 4,695,951, Cl. 364-200.000.
Horiuchi, Yutaka. Carrying case with a hinged lid and closure member. 4,694,940, Cl. 190-109.000.
Hormansdorfer, Gerd. Procedure and device for determining the jamming point of a pipe line in a drill hole. 4,694,902, Cl. 166-250.000.
Horng, Shi Y.: *See*—
Chen, Sheng K.; Horng, Shi Y.; and Chen, I-Ting, 4,694,639, Cl. 56-10.200.
Hornivius, Lothar, to Kuster & Co. GmbH. Cable window lift for vehicles. 4,694,610, Cl. 49-351.000.
Horvath, Ronald: *See*—
Elsmo, Thad; and Horvath, Ronald, 4,694,971, Cl. 215-253.000.
Hosiden Electronics Co., Ltd.: *See*—
Ichitsubo, Norio, 4,695,108, Cl. 439-59.000.
Hosoi, Yuichi: *See*—
Mori, Nobufumi; Hosoi, Yuichi; Takahashi, Kenji; and Miyahara, Junji, 4,695,725, Cl. 250-327.200.
Hossack, James M., to Ultrasonic Arrays, Inc. Ultrasonic transducer component and process for making the same and assembly. 4,695,986, Cl. 367-140.000.
Houchangnia, Zavoche, to Societe D'Electronique de La Region Pays de Loire. Device for receiving dual polarized microwave signals. 4,695,844, Cl. 343-781.0CA.
Houck, David L.: *See*—
Ritsko, Joseph E.; Houck, David L.; and Acla, Howard L. R., 4,695,439, Cl. 423-263.000.
Houghton, Alan N.: *See*—
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.
Howard, Peter G.: *See*—
Steenbergen, Christiaan; Howard, Peter G.; Bracht, Roger R.; and van der Put, Henk, 4,695,994, Cl. 369-54.000.
Howe, Steve R.; Warner, William B.; and Shores, J. Wallace. Container for attachment to animal ear tags. 4,694,781, Cl. 119-156.000.
Howell, Thomas H.: *See*—
Hooker, Lane K.; Howell, Thomas H.; and Ferrell, Charles W., 4,695,951, Cl. 364-200.000.
Howeth, David F. Pressure limiting acceleration control system and valve for hydraulic motors. 4,694,649, Cl. 60-468.000.
Howland, Gary R., to United Technologies Corporation. Dual redundant bus interface circuit architecture. 4,695,952, Cl. 364-200.000.
Howland, Warren W.: *See*—
Tuominen, Francis W.; Maier, Helmut K.; and Howland, Warren W., 4,695,453, Cl. 424-81.000.
Hoyt, Edwin D.: *See*—
Williams, David E.; and Hoyt, Edwin D., 4,695,703, Cl. 219-212.000.
Huang, Terry J.: *See*—
Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., 4,695,246, Cl. 431-31.000.
Huck, Charles T.: *See*—
Everhart, Robert W.; and Huck, Charles T., 4,695,836, Cl. 340-750.000.
Hudson, Geoffrey M., to Storage Research Pty. Ltd. Reading information stored in multiple frame format. 4,695,991, Cl. 369-44.000.
Huels Aktiengesellschaft: *See*—
Olbrich, Juergen; Biethan, Uwe; and Sorge, Gernold, 4,695,613, Cl. 525-533.000.
Hughes Aircraft Company: *See*—
Bagby, John P.; and Hedden, Richard L., 4,695,139, Cl. 350-620.000.
Beining, August H.; Dial, Larry A.; Smith, William A.; and Rieck, Gene W., 4,695,827, Cl. 340-365.00P.
Des Brisay, George S., Jr., 4,695,743, Cl. 307-272.200.

Lau, Kreisler S. Y.; and Kelleghan, William J., 4,695,655, Cl. 568-56.000.
Marshall, Neil A., 4,695,788, Cl. 324-527.000.
Patraw, Nils E., 4,695,870, Cl. 357-74.000.
Hughes Helicopters Inc.: *See*—
Head, Robert E.; and Yao, Samuel S., 4,695,227, Cl. 416-134.00A.
Hughes Tool Company: *See*—
Gambertoglio, Louis M., 4,694,878, Cl. 166-377.000.
Hughes Tool Company - USA: *See*—
Cunningham, Robert A., 4,694,855, Cl. 137-519.500.
Hui, Hsu W. Steerable electric toy car. 4,695,266, Cl. 446-454.000.
Hui, Sai H.: *See*—
Floyd, William C.; and Hui, Sai H., 4,695,606, Cl. 525-160.000.
Huls Aktiengesellschaft: *See*—
Homann, Walter K.; and Fischer, Lothar, 4,695,661, Cl. 568-903.000.
Otte, Werner; and Nehring, Rudolf, 4,695,660, Cl. 568-830.000.
Hultman, Kenneth L.: *See*—
Klebba, John M.; and Hultman, Kenneth L., 4,695,920, Cl. 361-118.000.
Humber, David C.: *See*—
Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,695,578, Cl. 514-397.000.
Humphrey Instruments, Inc.: *See*—
Shinn, Alan L., 4,695,831, Cl. 340-707.000.
Hung, Lam H., to Longreen Limited. Toy guns for firing pellets. 4,694,815, Cl. 124-27.000.
Hunter, Merle D.: *See*—
Hawkins, Richard A.; and Hunter, Merle D., 4,694,757, Cl. 110-271.000.
Hunter, Wayne W. Device for holding construction materials. 4,695,028, Cl. 248-354.100.
Hussain, Zubair: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.
Hutchins, MaryGail K.: *See*—
Crosby, Jane M.; and Hutchins, MaryGail K., 4,695,602, Cl. 524-439.000.
Hutchins, Richard D.; and Dovan, Hoai T., to Union Oil Company of California. Method for emplacement of a gelatinous foam in gas flooding enhanced recovery. 4,694,906, Cl. 166-294.000.
Hwang, Chern. Automobile fuse with damage indicator. 4,695,815, Cl. 337-266.000.
Hyatt, Wayne E.: *See*—
Hansen, Terris L.; Hyatt, Wayne E.; and Leung, Wu-Hon F., 4,695,977, Cl. 364-900.000.
Hydroacoustics Inc.: *See*—
Bouyoucos, John V., 4,695,987, Cl. 367-143.000.
Hydrotechnik GmbH: *See*—
Hoffmann, Helmuth, 4,694,681, Cl. 73-3.000.
Hynes, Joseph H.: *See*—
Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., 4,695,190, Cl. 405-169.000.
I-Flow Corporation: *See*—
Brown, Eric W., 4,695,273, Cl. 604-173.000.
I.G. Bauerhin GmbH Elektro-Technische Fabrik: *See*—
Altmann, Horst-Dieter; and Haupt, Eberhard, 4,695,091, Cl. 297-180.000.
Iacovangelo, Charles D.: *See*—
Zarnoch, Kenneth P.; and Iacovangelo, Charles D., 4,695,489, Cl. 427-438.000.
Ibarra, Inigo A., to Esperanza y Cia, S.A. Shell for firing practice. 4,694,755, Cl. 102-445.000.
Ichihashi, Hiroo; Ozawa, Masakazu; Ebinuma, Ryuichi; and Saito, Atsushi, to Canon Kabushiki Kaisha. Ink jet recorder. 4,695,855, Cl. 346-145.000.
Ichikawa, Katsumi: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, to Kabushiki Kaisha SG; and Bridgestone Corporation. Bag-cylinder control device in a tire vulcanizer. 4,695,235, Cl. 425-29.000.
Ichitsubo, Norio, to Hosiden Electronics Co., Ltd. Connector for flexible printed circuit board. 4,695,108, Cl. 439-59.000.
Ide, Kinya: *See*—
Hayase, Yoshio; Ohtsuka, Toshikazu; Ide, Kinya; and Takahashi, Toshio, 4,695,312, Cl. 71-92.000.
Igaki, Tetsuo: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.
Iijima, Toshijumi: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.
Iino, Tomohiko: *See*—
Kawamata, Yuuji; Iino, Tomohiko; Suzuki, Ryoichi; and Haga, Noriyuki, 4,695,481, Cl. 427-96.000.
Ikeda, Koichi; Nakamura, Kozi; and Okabe, Toshihiro, to Hitachi, Ltd. Virtual address system having fixed common bus cycles. 4,695,947, Cl. 364-200.000.
Ikeda, Masaki: *See*—
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Hiraka, Masahiro, 4,694,573, Cl. 29-846.000.
Ikemori, Keiji: *See*—
Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, 4,695,133, Cl. 350-427.000.
Ikoma, Kazuhiko: *See*—
Okuno, Akiyasu; Watanabe, Masakazu; and Ikoma, Kazuhiko, 4,695,517, Cl. 428-698.000.
Imaeda, Fumihiro; and Imaeda, Yoshio, to Shin Nihon Kohan Co., Ltd. Modular panel for mold. 4,695,033, Cl. 249-189.000.
Imaeda, Yoshio: *See*—
Imaeda, Fumihiro; and Imaeda, Yoshio, 4,695,033, Cl. 249-189.000.
Imai, Masahiro: *See*—
Yamashita, Kiyoshi; Aoshima, Terutaka; Narita, Ryuuho; and Imai, Masahiro, 4,695,710, Cl. 219-506.000.
Imai, Miho: *See*—
Yamamoto, Hiromi; Imai, Miho; and Suzuki, Noboru, 4,694,525, Cl. 15-160.000.
Imajo, Minoru: *See*—
Kawakita, Tsunehiro; and Imajo, Minoru, 4,694,793, Cl. 123-196.00S.
Imakoshi, Shigeyoshi; Soda, Yutaka; and Suyama, Hideo, to Sony Corporation. Thin film type magnetic transducer head. 4,695,908, Cl. 360-119.000.
Imanaka, Tadayuki: *See*—
Aiba, Shuichi; and Imanaka, Tadayuki, 4,695,546, Cl. 435-172.300.
Impco Carburetion, Inc.: *See*—
Bennett, David E., 4,694,811, Cl. 123-527.000.
Imperial Chemical Industries PLC: *See*—
Pinto, Alwyn; and Johnson, John B. H., 4,695,442, Cl. 423-359.000.
Imura, Yutaka: *See*—
Fukutomi, Hisao; Konishi, Takeshi; Kurasoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.
Inaba, Yoshiharu, to FANUC LTD. Injection molding apparatus. 4,695,237, Cl. 425-135.000.
Inaji, Toshio; Okamoto, Hiroshi; and Yokobori, Nobuyoshi, to Matsushita Electric Industrial Co., Ltd. Rotary head deflection apparatus. 4,695,907, Cl. 360-107.000.
Inanaga, Takugi: *See*—
Komatsubara, Masahiro; Kamimura, Tetsuro; Inanaga, Takugi; and Takahashi, Akira, 4,695,011, Cl. 242-199.000.
Inariba, Tokuzo. Manufacture of a miniature electric motor. 4,695,419, Cl. 264-259.000.
Incardona, Angelo: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.
Inductotherm Corporation: *See*—
Cartlidge, Jesse M., 4,695,316, Cl. 75-10.140.
Ing. C. Olivetti & C., S.p.A.: *See*—
Scardovi, Alessandro, 4,695,852, Cl. 346-140.00R.
Ing. Erich Pfeiffer GmbH & Co. KG: *See*—
Graf, Lothar; Maerte, Leo; and Skorka, Thomas, 4,694,977, Cl. 222-259.000.
Schuetz, Hans-Josef, 4,694,976, Cl. 222-189.000.
Ingersoll-Rand Company: *See*—
Kursar, James V., 4,694,732, Cl. 92-60.500.
Ingram, Arlen E.: *See*—
Eberhart, Edward; and Ingram, Arlen E., 4,694,618, Cl. 51-392.000.
Innova/Pure Water Inc.: *See*—
Nohren, John E., Jr.; and Downes, Richard T., 4,695,379, Cl. 210-282.000.
Inoue-Japax Research Incorporated: *See*—
Inoue, Kiyoshi; and Kaneko, Hideo, 4,695,333, Cl. 148-306.000.
Inoue, Kazuhiko; Mitani, Tatsuro; and Kishita, Yoshihiro, to Kabushiki Kaisha Toshiba. GAAS semiconductor device. 4,695,869, Cl. 357-71.000.
Inoue, Kimio: *See*—
Fukumizu, Shinnichi; Inoue, Kimio; and Kuriyama, Akimasa, 4,695,165, Cl. 366-90.000.
Inoue, Kiyoshi; and Kaneko, Hideo, to Inoue-Japax Research Incorporated. Iron-chromium-base spinodal decomposition-type magnetic (hard or semi-hard) alloy. 4,695,333, Cl. 148-306.000.
Inoue, Takeo: *See*—
Inoue, Yoshio; Arai, Masatoshi; and Inoue, Takeo, 4,695,603, Cl. 524-723.000.
Inoue, Takeshi: *See*—
Magami, Masato; Saeki, Kazumi; Miura, Takanori; and Inoue, Takeshi, 4,695,649, Cl. 560-86.000.
Inoue, Tomohiro: *See*—
Tsugei, Shinji; and Inoue, Tomohiro, 4,696,054, Cl. 455-89.000.
Inoue, Yasukazu: *See*—
Fukuzo, Yukio; and Inoue, Yasukazu, 4,695,980, Cl. 365-222.000.
Inoue, Yoshio; Arai, Masatoshi; and Inoue, Takeo, to Shin-Etsu Chemical Co., Ltd. Room temperature curable silicone rubber composition. 4,695,603, Cl. 524-723.000.
Inoue, Yoshio; Arai, Masatoshi; Sato, Shinichi; and Yokoo, Koji, to Shin-Etsu Chemical Co., Ltd. Room temperature-curable organopolysiloxane composition. 4,695,617, Cl. 528-32.000.
Inside Outfitters, Inc.: *See*—
Dunbar, Donn D., 4,694,877, Cl. 160-273.00R.

Institut Francais du Petrol: *See—*
Stern, Robert; Hillion, Gerard; Gateau, Paul; and Guibet, Jean-Claude, 4,695,411, Cl. 260-410.90R.
Institut Francais du Petrole: *See—*
Galtier, Pierre; and Busson, Christian, 4,695,370, Cl. 208-113.000.
Integrated Carbons Corporation: *See—*
Kindig, James K.; and Reynolds, James E., 4,695,290, Cl. 44-1.0SR.
Inter-Lock Steel Company, Inc.: *See—*
Mort, Edgar A., 4,694,675, Cl. 72-325.000.
International Business Machines Corporation: *See—*
Anastassiou, Dimitris; and Pennebaker, William B., 4,695,884, Cl. 358-163.000.
Blevins, Ballard J.; Kulpa, William G.; Mathis, Joseph R.; and McCullough, John W., 4,695,948, Cl. 364-200.000.
Brandt, Henry R.; Gannon, Patrick M.; Leung, Wan L.; and Marchini, Timothy R., 4,695,950, Cl. 364-200.000.
Ellis, Joseph J., Jr., 4,695,838, Cl. 340-771.000.
Irwin, John W., 4,695,945, Cl. 364-200.000.
Kerr, Randal H.; and Mesnard, Robert M., 4,696,003, Cl. 371-19.000.
Lebizay, Gerald, 4,695,999, Cl. 370-58.000.
Millham, Ernest H.; Moser, John J.; Shushereba, John J.; and Visco, Gary P., 4,696,005, Cl. 371-27.000.
Montanari, Gerard M.; Baudelot, Francis E.; and Costes, Michel L., 4,695,997, Cl. 370-13.000.
International Flavors & Fragrances Inc.: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., 4,695,473, Cl. 426-535.000.
Inumaru, Susumu: *See—*
Yoshida, Masahiro; and Inumaru, Susumu, 4,694,888, Cl. 164-467.000.
Iriyama, Shozo; and Abe, Mitsuo, to Daido Tokushuko Kabushiki Kaisha. Fingertip protectors for work gloves. 4,694,508, Cl. 2-21.000.
Irwin, John W., to International Business Machines Corporation. Processor I/O and interrupt filters allowing a co-processor to run software unknown to the main processor. 4,695,945, Cl. 364-200.000.
Irwin, Lawrence: *See—*
Anderson, Paul T.; Irwin, Lawrence; Matthews, John C.; and Paugh, Charles E., 4,694,634, Cl. 53-88.000.
Iseki, Yukito: *See—*
Ogasawara, Toshitaka; Nohmi, Kazumasa; Honmoh, Masao; and Iseki, Yukito, 4,695,763, Cl. 313-487.000.
Ishibashi, Hiroshi: *See—*
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Ishibashi, Takao: *See—*
Nakano, Jiro; Ishibashi, Takao; Akatsuka, Takao; and Kawaguchi, Masao, 4,694,809, Cl. 123-489.000.
Ishida, Koji; and Matumura, Hiroyoshi, to Hitachi, Ltd. Optical thin film waveguide. 4,695,122, Cl. 350-96.120.
Ishida, Masahiro; Kato, Shunichi; and Takasu, Noboru, to Kabushiki Kaisha Toshiba. Toroidal winding apparatus. 4,694,999, Cl. 242-4.00R.
Ishida Scales Manufacturing Company, Ltd.: *See—*
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.
Ishida, Takao; Yoshida, Yukio; and Ohno, Kenzo, to Yoshida Kogyo K.K. Apparatus for detecting door movement data in an automatic door system. 4,694,607, Cl. 49-25.000.
Ishida, Toru: *See—*
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; and Ishida, Toru, 4,695,403, Cl. 252-513.000.
Watanabe, Hirotoshi; Makino, Osamu; and Ishida, Toru, 4,695,504, Cl. 428-209.000.
Ishiguro, Nobuya: *See—*
Kondo, Kazuo; Ishiguro, Nobuya; and Tada, Teruo, 4,695,491, Cl. 428-35.000.
Ishiguro, Shinichi: *See—*
Takeuchi, Yasuhito; Hirota, Yuichi; Sano, Shinichi; and Ishiguro, Shinichi, 4,694,680, Cl. 73-1.0DV.
Ishii, Akihiro: *See—*
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Ishii, Fumio: *See—*
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.
Ishii, Hiroshi; Nakai, Syunzi; and Mizumoto, Yukihiro, to Sharp Kabushiki Kaisha. Method and apparatus for recording. 4,695,847, Cl. 346-1.100.
Ishii, Kazuyoshi: *See—*
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, to Minolta Camera Kabushiki Kaisha. Reader-printer having an image rotation device. 4,695,155, Cl. 355-45.000.
Ishikawa, Katsuji: *See—*
Yoshino, Tsunemi; Ishikawa, Katsuji; and Iwata, Hiroshi, 4,695,144, Cl. 354-195.110.
Ishikawa, Kazumasa; and Koseki, Yuji, to Ricoh Company, Ltd. Facsimile machine using cut sheets of paper. 4,695,898, Cl. 358-296.000.
Ishikawa, Sueyoshi: *See—*
Hisamoto, Iwao; Hirai, Masaru; and Ishikawa, Sueyoshi, 4,695,488, Cl. 427-385.500.
Ishikawa, Takatoshi: *See—*
Nakamura, Kotaro; and Ishikawa, Takatoshi, 4,695,530, Cl 430-381.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Matsui, Kunio; Fukase, Hisahiko; and Nomura, Akihiro, 4,694,887, Cl. 164-428.000.
Ishizumi, Kikuo: *See—*
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.
Isotechnologies, Inc.: *See—*
Miles, James E., 4,695,100, Cl. 303-10.000.
Isover Saint-Gobain: *See—*
Cousin, Stephane; and Boumendil, Jean-Paul, 4,695,338, Cl. 156-71.000.
ISPO GmbH: *See—*
Nicklas, Hans; and Pruzina, Christoph, 4,694,626, Cl. 52-309.120.
Isuzu Motors Limited: *See—*
Kawamura, Hideo, 4,694,653, Cl. 60-597.000.
Kawamura, Hideo, 4,694,654, Cl. 60-605.000.
Itaba, Tunesaku: *See—*
Kobayashi, Daisaku; Itaba, Tunesaku; and Momose, Yutaka, 4,694,707, Cl. 74-606.00A.
Itagaki, Masanori; Takahashi, Junichi; and Endou, Hideyasu, to Ricoh Company, Ltd. Electronic device carrier. 4,695,678, Cl. 174-52.0FP.
Itakura, Tohru, to Fujitsu Limited. Semiconductor memory device. 4,695,978, Cl. 365-51.000.
Ito, Kenji, to Kabushiki Kaisha Toshiba. Digital time interval measuring apparatus. 4,695,781, Cl. 318-603.000.
Ito, Mikiya: *See—*
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, 4,695,235, Cl. 425-29.000.
Ito, Shintaro: *See—*
Iwasaki, Hiroshi; and Ito, Shintaro, 4,694,562, Cl. 437-57.000.
Ito, Takao: *See—*
Watanabe, Fumio; Komaki, Shojiro; Miyamoto, Masao; and Ito, Takao, 4,695,724, Cl. 250-292.000.
Itoh, Hajime; and Mitani, Kazuiami, to Mitsubishi Rayon Co., Ltd. Hydrophilized porous membrane and production process thereof. 4,695,592, Cl. 521-54.000.
Itoh, Hirotaka: *See—*
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Itoh, Takeo: *See—*
Hashimoto, Minoru; Takeuchi, Hajime; and Itoh, Takeo, 4,695,513, Cl. 428-425.900.
Itonaga, Makoto; and Kayanuma, Kanji, to Victor Company of Japan, Ltd. Film thickness measuring apparatus. 4,695,162, Cl. 356-369.000.
ITT Industries, Inc.: *See—*
Zaehringer, Edmund; Baker, Peotr; and Zettel, Rolf, 4,696,018, Cl. 375-82.000.
Iwahara, Makoto; Miyaji, Naotaka; and Sakamoto, Atsushi, to Victor Company of Japan, Ltd. Microphone apparatus having a variable directivity pattern. 4,696,043, Cl. 381-92.000.
Iwakura, Tatsuya: *See—*
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.
Iwamoto, Michinori: *See—*
Shimizu, Tetsuo; Tujimura, Kiyoharu; and Iwamoto, Michinori, 4,695,034, Cl. 251-129.060.
Iwamoto, Tetsuo: *See—*
Amemori, Hiroyuki; Nishiyama, Shigeru; and Iwamoto, Tetsuo, 4,694,702, Cl. 73-861.240.
Iwasaki, Hiroshi; and Ito, Shintaro, to Kabushiki Kaisha Toshiba. Method for manufacturing a semiconductor integrated device including bipolar and CMOS transistors. 4,694,562, Cl. 437-57.000.
Iwashita, Kiyoji: *See—*
Kurosawa, Yukio; and Iwashita, Kiyoji, 4,695,689, Cl. 200-144.00B.
Iwata, Hiroshi: *See—*
Yoshino, Tsunemi; Ishikawa, Katsuji; and Iwata, Hiroshi, 4,695,144, Cl. 354-195.110.
Izumi, Tsunetada: *See—*
Gojo, Tomomi; Yagi, Yoshio; and Izumi, Tsunetada, 4,695,834, Cl. 340-734.000.
J. M. Ney Company, The: *See—*
Kulig, Frank M., 4,695,705, Cl. 219-354.000.
J. M. Voith GmbH: *See—*
Grossmann, Udo; Holzinger, Dieter; and Rohde, Guenter, 4,695,004, Cl. 242-56.00R.
J. W. Harris Company: *See—*
Ballentine, Richard E.; and Henson, Robert M., 4,695,428, Cl. 420-561.000.
Jackson, Carl E. Exterior brake for tandem tires. 4,694,936, Cl. 188-2.00R.
Jackson, Kenneth R.; and Tofigh, Farshid, to Leach Corporation. Inductive power controller. 4,695,917, Cl. 361-58.000.

Jacobson, Dov, to Time Video Information Services, Inc. Analog color selector. 4,695,832, Cl. 340-709.000.

Jacoby, Donald: *See*—
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.

Jacoby, Hans-Dieter; and Schmidt, Peter, to Ernst Leitz Wetzlar GmbH. Device for automatically transporting disk shaped objects. 4,695,215, Cl. 414-225.000.

Jahnke, Andreas; Ries, Gunter; and Meier, Konrad, to Siemens Aktiengesellschaft. Apparatus for manufacturing a disc-shaped curved magnet coil. 4,694,868, Cl. 140-92.100.

James, Donald R.: *See*—
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.

Jang, Young H. Combined key and combination lock. 4,694,670, Cl. 70-303.00R.

Janos, Eva: *See*—
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

Janouschek, Heinz, to F. Gegauf AG Bernina Nahmaschinenfabrik. Laterally swingable sewing machine presser device. 4,694,764, Cl. 112-237.000.

Jansen, Johann: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Jansen, Martin; and Standke, Burkhard, to Degussa Aktiengesellschaft. Process for the production of silver (III) oxide. 4,695,353, Cl. 204-96.000.

Janssen Pharmaceutica N.V.: *See*—
Janssens, Frans E.; Torremans, Joseph L. G.; Hens, Jozef E.; and Van Offenwert, Theophilus T. J. M., 4,695,569, Cl. 514-258.000.
Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,695,575, Cl. 514-322.000.

Janssen, Wladmir, to Domtar Inc. Method to automatically determine the size distribution of shive and analyzer therefor. 4,694,683, Cl. 73-63.000.

Janssens, Frans E.; Torremans, Joseph L. G.; Hens, Jozef E.; and Van Offenwert, Theophilus T. J. M., to Janssen Pharmaceutica N.V. Bicyclic heterocyclyl containing N-(bicyclic heterocyclyl)-4-piperidinamines. 4,695,569, Cl. 514-258.000.

Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., to Janssen Pharmaceutica, N.V. 4-[(bicycle heterocyclyl)-methyl and -hetero]-piperidines. 4,695,575, Cl. 514-322.000.

Japan Synthetic Rubber Co., Ltd.: *See*—
Yamazaki, Yoshihide; Uchimura, Kazumi; Yamashita, Satoshi; and Takeuchi, Mikio, 4,695,614, Cl. 526-142.000.

Japan Tobacco, Inc.: *See*—
Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, 4,695,007, Cl. 242-58.400.

Japane Styrene Paper Corporation: *See*—
Kuwabara, Hideki; Kitagawa, Atsushi; and Sudo, Yoshimi, 4,695,593, Cl. 521-60.000.

Jatnieks, Girts U., to Honeywell Inc. System for insuring rotational direction for an alternating current motor. 4,695,782, Cl. 318-748.000.

Jehl, Patrice: *See*—
Ermacora, Rino; and Jehl, Patrice, 4,694,640, Cl. 56-16.400.

Jehle, Franz; and Meinel, Holger, to Licentia Patent-Verwaltungs-GmbH. Aircraft radar arrangement. 4,695,842, Cl. 342-59.000.

Jelcin, Michael J.: *See*—
Belleau, Gordon F.; Jelcin, Michael J.; and Verga, Charles F., 4,695,342, Cl. 156-173.000.

Jenison, Robert E. Collapsible dumbbells. 4,695,051, Cl. 272-122.000.

Jenkins, R. W.: *See*—
MacDonald, R. I.; Lam, D. K. W.; and Jenkins, R. W., 4,696,059, Cl. 455-600.000.

Jenkner, Erwin. Process for the manufacture of panel-type workpieces with assembly bores, more particularly, made of wood or wood-like material and apparatus for performing the process. 4,694,871, Cl. 144-35.00R.

Jensen, Otto S. Oil drop collector. 4,695,088, Cl. 296-38.000.

Jet Research Inc.: *See*—
Dines, Jack E.; and Gillingham, Ernest L., 4,694,754, Cl. 102-310.000.

JGB Industries, Inc.: *See*—
Sparkes, Laurie R.; and Baker, Joseph G., 4,694,773, Cl. 114-354.000.

Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Saito, Yasuziro, 4,695,180, Cl. 403-114.000.

John T. Hepburn, Limited: *See*—
Hepburn, James; and Malashenko, Leon, 4,694,744, Cl. 100-214.000.

Johnson, Cydney A.: *See*—
Levine, Peter A.; Cobb, Arthur L., Jr.; Johnson, Cydney A.; and Peterson, Gary R., 4,695,878, Cl. 358-44.000.

Johnson, Gerald L.: *See*—
Bhalaik, Arun; Braddick, Peter W.; Brittin, Darryl S.; and Johnson, Gerald L., 4,695,194, Cl. 405-207.000.

Johnson, Harold V.: *See*—
Schoenbaum, Gary L.; Latanzi, Lewis A.; Hedrick, Stephen L.; and Johnson, Harold V., 4,695,157, Cl. 356-237.000.

Johnson, John B. H.: *See*—
Pinto, Alwyn; and Johnson, John B. H., 4,695,442, Cl. 423-359.000.

Johnson, Johnny R.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.

Johnson & Johnson Products, Inc.: *See*—
Dyer, John; and Kennette, John W., 4,695,500, Cl. 428-134.000.

Johnson Matthey, Inc.: *See*—
Becker, E. Robert; and Jung, Hyun J., 4,695,438, Cl. 423-239.000.
Jung, Hyun J., 4,695,437, Cl. 423-239.000.

Johnson, Terry W.; Harms, Daryl E.; and Curl, Ricky L., to Postron Corp. Electronic information dissemination system. 4,695,880, Cl. 358-86.000.

Johnston, Bruce L., to Butler Manufacturing Company. Shear beam weigh axle transducer. 4,694,921, Cl. 177-136.000.

Johnston, Fred E. Hand powered tricycle having a wheelchair hitch. 4,695,071, Cl. 290-204.000.

Johnston, John G., to M. O. Enterprises, Inc. Air pressure gauge tool. 4,694,691, Cl. 73-146.800.

Jolivet, Michel: *See*—
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.

Joly, Jean-Pierre A.: *See*—
Saingier, Jean; and Joly, Jean-Pierre A., 4,695,641, Cl. 549-552.000.

Jonas, Siegfried, to Beral Bremsbelag GmbH. Friction elements, especially for drum brakes. 4,694,937, Cl. 188-73.100.

Jones, John I.: *See*—
Provence, John D.; Brown, Frederick W.; and Jones, John I., 4,695,700, Cl. 219-121.0PD.

Jones, Keith W.: *See*—
Jones, Robert; Jones, Keith W.; and Baxter, William R. S., 4,694,690, Cl. 73-146.000.

Jones, Lloyd G.; and Stowe, Lawrence R., to Mobil Oil Corporation. Situ disposable gel canister. 4,694,727, Cl. 86-20.150.

Jones, Richard H.: *See*—
Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., 4,695,190, Cl. 405-169.000.

Jones, Robert; Jones, Keith W.; and Baxter, William R. S., to Pandrol Limited. Measuring displacement between two relatively movable structures. 4,694,690, Cl. 73-146.000.

Jongerius B.V.: *See*—
Jongerius, Sebastiaan C. E., 4,694,715, Cl. 83-72.000.

Jongerius, Sebastiaan C. E., to Jongerius B.V. Slicing device for bread or the like. 4,694,715, Cl. 83-72.000.

Jorgens, Reinhard; Faltermeier, Bernd; and Trautwein, Franz, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Motorized focus drive for a microscope. 4,695,137, Cl. 350-521.000.

Jorgensen, Walter E.; and Linquist, Robert L. Flow control valve. 4,694,848, Cl. 137-114.000.

Jos. Schneider Optische Werke Kreuznach GmbH & Co. KG: *See*—
Schitthof, Hiltrud, 4,695,136, Cl. 350-472.000.

Josephson, Lee: *See*—
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,392, Cl. 252-62.540.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,393, Cl. 252-62.540.

Joyce, Thomas F.: *See*—
Keeley, James W.; and Joyce, Thomas F., 4,695,943, Cl. 364-200.000.

Juarros, Richard D.: *See*—
Dishner, Bryan W.; Juarros, Richard D.; and Dhyanchand, P. John, 4,695,776, Cl. 318-14.000.

Juhas, William M. Modular pre-insulated, pre-finished building block. 4,694,624, Cl. 52-228.000.

Juhola, Pentti, to Rintekno Oy. Method and equipment for utilization of the freezing heat of water as a source of heat of a heat pump. 4,694,658, Cl. 62-100.000.

Julstrom, Stephen D., to Shure Brothers, Inc. Directional enhancement circuit. 4,696,036, Cl. 381-22.000.

Jung, Hyun J., to Johnson Matthey, Inc. Selective catalytic reduction catalysts. 4,695,437, Cl. 423-239.000.

Jung, Hyun J.: *See*—
Becker, E. Robert; and Jung, Hyun J., 4,695,438, Cl. 423-239.000.

Jurczyszyn, Michel: *See*—
Hakoun, Roland; and Jurczyszyn, Michel, 4,695,306, Cl. 65-152.000.

Jyumonji, Hiromichi: *See*—
Satoh, Hidetaka; Kurosawa, Hideyuki; Kamijoh, Yoshiaki; and Jyumonji, Hiromichi, 4,695,916, Cl. 361-56.000.

Kable, Robert G., to Scriptel Corporation. Stylus for position responsive apparatus having electrographic application. 4,695,680, Cl. 178-19.000.

Kabushiki Kaisha Hikoma Seisakusho: *See*—
Kishi, Mitsuihiro, 4,694,930, Cl. 182-2.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.

Fukumizu, Shinnichi; Inoue, Kimio; and Kuriyama, Akimasa, 4,695,165, Cl. 366-90.000.
Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, 4,695,233, Cl. 418-83.000.
Kabushiki Kaisha Komatsu Seisakusho: *See*—
Yoshida, Kazuhiro, 4,694,647, Cl. 60-442.000.
Kabushiki Kaisha Riken: *See*—
Kobayashi, Daisaku; Itaba, Tunesaku; and Momose, Yutaka, 4,694,707, Cl. 74-606.00A.
Kabushiki Kaisha SG: *See*—
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, 4,695,235, Cl. 425-29.000.
Kabushiki Kaisha Toshiba: *See*—
Hara, Hiroyuki; Nakamura, Michinori; and Sugimoto, Yasuhiro, 4,695,750, Cl. 307-475.000.
Hashimoto, Minoru; Takeuchi, Hajime; and Itoh, Takeo, 4,695,513, Cl. 428-425.900.
Inoue, Kazuhiko; Mitani, Tatsuro; and Kishita, Yoshihiro, 4,695,869, Cl. 357-71.000.
Ishida, Masahiro; Kato, Shunichi; and Takasu, Noboru, 4,694,999, Cl. 242-4.00R.
Ito, Kenji, 4,695,781, Cl. 318-603.000.
Iwasaki, Hiroshi; and Ito, Shintaro, 4,694,562, Cl. 437-57.000.
Kawakami, Hiroshi, 4,695,990, Cl. 369-38.000.
Morita, Hiroyuki, 4,696,056, Cl. 455-182.000.
Watanabe, Junji, 4,695,151, Cl. 355-3.00R.
Watanabe, Junji, 4,695,154, Cl. 355-8.000.
Watanabe, Junji, 4,695,897, Cl. 358-296.000.
Yamanishi, Eiichi, 4,695,896, Cl. 358-296.000.
Yamashita, Kiyoshi; Aoshima, Terutaka; Narita, Ryuuho; and Imai, Masahiro, 4,695,710, Cl. 219-506.000.
Yamaura, Mitsuru; and Fujisawa, Norio, 4,695,931, Cl. 363-8.000.
Kabushikikaisha Tokyo Keiki: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.
Kadota, Shigekazu: *See*—
Nishihama, Takamichi; Okada, Kotaro; and Kadota, Shigekazu, 4,695,044, Cl. 269-21.000.
Kageyama, Kunio; and Takasugi, Sumio, to Yokohama Rubber Co., Ltd., The. Adhesive composition. 4,695,508, Cl. 428-261.000.
Kahn, Gerhard: *See*—
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,695,380, Cl. 210-347.000.
Kainer, Hartmut: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.
Kairis, Alexandre; and Colsen, Ronnie H., to Waco Trading Corporation. Electro-therapeutic device. 4,694,840, Cl. 128-735.000.
Kaiser, Timothy D.: *See*—
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.
Kajiho, Tokuaki: *See*—
Uemura, Toshinobu; Shinooka, Kiyohide; and Kajiho, Tokuaki, 4,695,467, Cl. 424-502.000.
Kako, Noritoshi: *See*—
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,695,966, Cl. 364-521.000.
Kalaskie, Frank E.: *See*—
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.
Kalfa, Horst: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.
Kali-Chemie Pharma GmbH: *See*—
Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, 4,695,566, Cl. 514-234.000.
Kalk, Walter; Schundehutte, Karl H.; and Soll, Manfred, to Bayer Aktiengeseilschaft. Quaternary reactive compounds. 4,695,632, Cl. 544-194.000.
Kallberg, Bjorn. Device for guiding a tool along a curve. 4,694,579, Cl. 33-23.080.
Kalopissis, Gregoire; and Vanlerberghe, Guy, to L'Oreal. Cationic surface-active agents. 4,695,653, Cl. 564-505.000.
Kalt, Charles G. Electrostatic display device with improved fixed electrode. 4,695,837, Cl. 340-763.000.
Kalter, Jan: *See*—
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.
Kamewa AB: *See*—
Flyborg, Nils O.; and Bjorheden, Orvar, 4,694,645, Cl. 60-221.000.
Kameya, Kazuo, to Elmec Corporation. Electromagnetic delay line with inductance element with transversely staggered stacked conducting portions. 4,695,812, Cl. 333-156.000.
Kamiji, Koichi; and Ohya, Toshikazu, to Honda Giken Kogyo Kabushiki Kaisha. Air bag device for vehicles. 4,695,075, Cl. 280-735.000.
Kamijoh, Yoshiaki: *See*—
Satoh, Hidetaka; Kurosawa, Hideyuki; Kamijoh, Yoshiaki; and Jyumonji, Hiromichi, 4,695,916, Cl. 361-56.000.
Kamimura, Tetsuro: *See*—
Komatsubara, Masahiro; Kamimura, Tetsuro; Inanaga, Takugi; and Takahashi, Akira, 4,695,011, Cl. 242-199.000.
Kamrath, Theresa K. Bib with teething surface. 4,694,510, Cl. 2-49.00R.
Kanai, Hideo; Komba, Toshinori; and Mogi, Eiji, to Nagase Medical Supply Co., Ltd. Apparatus for automatically changing X-ray films. 4,694,571, Cl. 29-806.000.
Kaneko, Hideo: *See*—
Inoue, Kiyoshi; and Kaneko, Hideo, 4,695,333, Cl. 148-306.000.
Kaneko, Kazuyuki: *See*—
Monno, Asao; Watanabe, Kiyoo; and Kaneko, Kazuyuki, 4,695,729, Cl. 250-358.100.
Kaneoya, Tatsuo: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.
Kansai Environmental Development Co., Ltd.: *See*—
Sakamoto, Tsutomu, 4,694,716, Cl. 83-112.000.
Kanzawa, Masahide: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.
Kao Corporation: *See*—
Yamamoto, Hiromi; Imai, Miho; and Suzuki, Noboru, 4,694,525, Cl. 15-160.000.
Karam, Ronald E.: *See*—
Schulze, Harry O.; and Karam, Ronald E., 4,695,478, Cl. 427-71.000.
Karl Bauer Spezialtiefbau GmbH & Co KG: *See*—
Bauer, Karlheinz; and Arzberger, Maximilian, 4,694,915, Cl. 175-91.000.
Karl Deutsch Pruf- und Messgeratebau GmbH+Co. KG: *See*—
Deutsch, Volker K.; and Roddeck, Werner F., 4,695,797, Cl. 324-230.000.
Karlsson, Axel T.; and Stand, Mille. Thermal spray apparatus for coating a substrate with molten fluent material. 4,694,990, Cl. 239-81.000.
Kaschemekat, Jurgen: *See*—
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,695,380, Cl. 210-347.000.
Kashida, Motokazu: *See*—
Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, 4,696,008, Cl. 371-47.000.
Kashiwagi, Hiroshi: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.
Kasle, Leonard: *See*—
Lundy, Allen W.; and Kasle, Leonard, 4,694,559, Cl. 29-559.000.
Kasle Steel Corporation: *See*—
Lundy, Allen W.; and Kasle, Leonard, 4,694,559, Cl. 29-559.000.
Katagiri, Hidenori: *See*—
Miura, Hirohisa; Satoh, Hiroshi; Natsume, Toshio; and Katagiri, Hidenori, 4,695,319, Cl. 75-63.000.
Katagiri, Shuhei: *See*—
Takezawa, Hatsuo; Donuma, Kenichi; Katagiri, Shuhei; and Sakura, Shigeyuki, 4,695,858, Cl. 357-19.000.
Katayama, Hiroyuki: *See*—
Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, 4,695,514, Cl. 428-432.000.
Katayama, Shigeru: *See*—
Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, 4,695,598, Cl. 523-400.000.
Kato, Kenji; Matsushita, Soichi; and Nakanishi, Kiyoshi, to Toyota Jidosha Kabushiki Kaisha. Method and device for control of internal combustion engine variable swirl air fuel intake system with direct helical intake passage. 4,694,794, Cl. 123-306.000.
Kato, Masaki; and Yamazaki, Tsutomu, to Nissan Motor Company, Limited. Automotive engine idling speed control system with variable idling speed depending upon cooling air temperature in automotive air conditioning system. 4,694,798, Cl. 123-339.000.
Kato, Masashi: *See*—
Oshikoshi, Yuji; Kato, Masashi; and Kikuchi, Hisashi, 4,695,143, Cl. 354-86.000.
Kato, Masatoshi: *See*—
Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, 4,695,525, Cl. 430-151.000.
Kato, Nobuyuki: *See*—
Nakakura, Yukinori; and Kato, Nobuyuki, 4,695,479, Cl. 437-228.000.
Kato, Shinya: *See*—
Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, 4,695,007, Cl. 242-58.400.
Kato, Shunichi: *See*—
Ishida, Masahiro; Kato, Shunichi; and Takasu, Noboru, 4,694,999, Cl. 242-4.00R.
Kato, Yasuo: *See*—
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.

Kato, Yoji; Watanabe, Seiichi; and Wada, Masaru, to Sony Corporation. Semiconductor apparatus. 4,695,862, Cl. 357-36.000.

Katoh, Katsunori: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Katsube, Junki: *See*—
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.

Katz, Alan H.: *See*—
Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., 4,695,658, Cl. 568-763.000.

Katzmann, Fred L., to Ballantine Laboratories, Inc. Resistive sensing thermal device for current measurement. 4,695,793, Cl. 324-106.000.

Kawada, Shin-Ichi: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.

Kawaguchi, Masao: *See*—
Nakano, Jiro; Ishibashi, Takao; Akatsuka, Takao; and Kawaguchi, Masao, 4,694,809, Cl. 123-489.000.

Kawaguchi, Takeshi: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,694,938, Cl. 188-181.00A.

Kawahara, Atsushi; and Takatsu, Norihiko, to Nippon Kogaku K.K. Solid-state area imaging device having interline transfer CCD means. 4,696,021, Cl. 377-58.000.

Kawai, Makoto: *See*—
Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; and Fujii, Isao, 4,694,799, Cl. 123-425.000.

Kawai, Masato, to NEC Corporation. Method of generating test patterns for logic network devices. 4,696,006, Cl. 371-27.000.

Kawai, Shoichi: *See*—
Nakanishi, Yasuhiro; and Kawai, Shoichi, 4,695,976, Cl. 364-900.000.

Kawakami, Hiroshi, to Kabushiki Kaisha Toshiba. Autochanger type disc player. 4,695,990, Cl. 369-38.000.

Kawakatsu, Satoshi: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Kawakita, Tsunehiro; and Imajo, Minoru, to Nissan Motor Co., Ltd. Engine lubricant type and condition monitoring system. 4,694,793, Cl. 123-196.00S.

Kawamata, Syooichi: *See*—
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,694,688, Cl. 73-116.000.

Kawamata, Yuuji; Iino, Tomohiko; Suzuki, Ryoichi; and Haga, Noriyuki, to Senju Metal Industry Co., Ltd. Method of performing plating of an item having fine parts and a support device therefor. 4,695,481, Cl. 427-96.000.

Kawamoto, Hiroshi, to Hitachi, Ltd. Dynamic storage device with extended information holding time. 4,695,864, Cl. 357-41.000.

Kawamoto, Kenichi, to Canon Kabushiki Kaisha. Motor built-in lens mounting. 4,695,145, Cl. 354-271.100.

Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, to Honda Giken Kogyo Kabushiki Kaisha. Front and rear wheel steering device. 4,695,068, Cl. 280-91.000.

Kawamura, Hideo, to Isuzu Motors Limited. Engine energy recovery apparatus. 4,694,653, Cl. 60-597.000.

Kawamura, Hideo, to Isuzu Motors Limited. Exhaust energy recovery and generator for use with an engine. 4,694,654, Cl. 60-605.000.

Kawanabe, Tomohiko: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.

Kawasaki, Keiji, to NGK Insulators, Ltd. Method and device for spin-testing of turbocharger rotor. 4,694,689, Cl. 73-118.100.

Kaya, Seiji: *See*—
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, 4,694,748, Cl. 101-401.100.

Kayanuma, Kanji: *See*—
Itonaga, Makoto; and Kayanuma, Kanji, 4,695,162, Cl. 356-369.000.

Kearney, Calvin T.: *See*—
Barraza, Arthur; and Kearney, Calvin T., 4,695,222, Cl. 415-80.000.

Kearsley, Andrew J., to Oxford Lasers Limited. Laser device employing a porous material in the discharge chamber. 4,696,011, Cl. 372-61.000.

Keeley, James W.; and Joyce, Thomas F., to Honeywell Information Systems Inc. Multiprocessor shared pipeline cache memory with split cycle and concurrent utilization. 4,695,943, Cl. 364-200.000.

Keen, Frederick I.: *See*—
Choy, Clement K.; Keen, Frederick I.; Garabedian, Aram; and Spurgeon, Colleen J., 4,695,394, Cl. 252-97.000.

Kehrbach, Wolfgang: *See*—
Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, 4,695,566, Cl. 514-234.000.

Keithley, Howard W., Jr., to Keithley, Marie E.; Keithley, Steven W.; and Kelly, Gwenn M., part interest to each. Shape adaptable protective cushion device and method of making and using same. 4,694,774, Cl. 114-361.000.

Keithley, Marie E.: *See*—
Keithley, Howard W., Jr., 4,694,774, Cl. 114-361.000.

Keithley, Steven W.: *See*—
Keithley, Howard W., Jr., 4,694,774, Cl. 114-361.000.

Kelleghan, William J.: *See*—
Lau, Kreisler S. Y.; and Kelleghan, William J., 4,695,655, Cl. 568-56.000.

Keller, Jakob: *See*—
Hellat, Jaan; and Keller, Jakob, 4,695,225, Cl. 415-189.000.

Kelley Company, Inc.: *See*—
Erlandsson, Kjell I., 4,695,216, Cl. 414-401.000.

Kelly, Gwenn M.: *See*—
Keithley, Howard W., Jr., 4,694,774, Cl. 114-361.000.

Kemmler, Ralf-Rainer, to Stihl, Andreas. Motor-driven chain saw. 4,694,578, Cl. 30-383.000.

Kemnetz, Steven J.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.

Kemper, Yves J., to Tractiontec Corporation. Radially oriented nutational traction drive transmission with large range of speed ratios. 4,694,701, Cl. 74-191.000.

Keneticon Limited: *See*—
Young, David N., 4,695,707, Cl. 219-392.000.

Kennedy, James D. Drilling assembly for percussion drilling of deep wells. 4,694,911, Cl. 173-62.000.

Kennedy, Jesse R.; and Kennedy, Marcus R. Apparatus for imaging infrared emitting surfaces. 4,695,881, Cl. 358-100.000.

Kennedy, John M.; and Kennedy, William R. Jack for installing a mine stopping. 4,695,035, Cl. 254-93.00R.

Kennedy, Marcus R.: *See*—
Kennedy, Jesse R.; and Kennedy, Marcus R., 4,695,881, Cl. 358-100.000.

Kennedy, William R.: *See*—
Kennedy, John M.; and Kennedy, William R., 4,695,035, Cl. 254-93.00R.

Kennette, John W.: *See*—
Dyer, John; and Kennette, John W., 4,695,500, Cl. 428-134.000.

Kennis, Ludo E. J.: *See*—
Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,695,575, Cl. 514-322.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Fischer, Klaus, 4,695,347, Cl. 156-610.000.
Teuchert, Eberhardt; Haas, Klaus-Arne; and Gerwin, Helmut, 4,695,423, Cl. 376-265.000.

Kernforschungszentrum Karlsruhe GmbH: *See*—
Ehrfeld, Wolfgang; and Hagmann, Peter, 4,694,548, Cl. 29-157.00C.

Kerr, G. T.: *See*—
Derouane, E. G.; Dessau, R. M.; Heilweil, I. J.; and Kerr, G. T., 4,695,642, Cl. 556-14.000.

Kerr, Randal H.; and Mesaard, Robert M., to International Business Machines Corporation. System for testing interactive software. 4,696,003, Cl. 371-19.000.

Kershaw, Carolyn A.: *See*—
Blakeley, Douglas M.; Kershaw, Carolyn A.; and Gangarosa, Raymond E., 4,694,837, Cl. 128-653.000.

Kessler, Saul. Fuel additive. 4,695,293, Cl. 44-68.000.

Keuter, Dale H.; and Keuter, Karl A. Animal actuated feeder. 4,694,780, Cl. 119-53.500.

Keuter, Karl A.: *See*—
Keuter, Dale H.; and Keuter, Karl A., 4,694,780, Cl. 119-53.500.

Khoe, Giok D.: *See*—
Faessen, Louis M. H.; and Khoe, Giok D., 4,695,129, Cl. 350-96.250.

Khowaylo, Alex: *See*—
Forte, Mark R.; Khowaylo, Alex; and Schloesser, Ewald, 4,695,282, Cl. 623-22.000.

Kidde, Inc.: *See*—
Barraza, Arthur; and Kearney, Calvin T., 4,695,222, Cl. 415-80.000.

Kigasawa, Kazuo; Ohtani, Hideaki; Tanaka, Makoto; and Hayashida, Shigeru, to Takeda Chemical Industry, Ltd. Soft patch. 4,695,465, Cl. 424-449.000.

Kihara, Tadaharu: *See*—
Makino, Hiroshi; Yoshino, Tsunemi; Kihara, Tadaharu; and Takashima, Akira, 4,695,893, Cl. 358-227.000.

Kikendall, Garth D.: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.

Kikkawa, Masatoshi, to Nissan Motor Co., Ltd. Vehicle steering system. 4,694,926, Cl. 180-132.000.

Kikuchi, Hisashi: *See*—
Oshikoshi, Yuji; Kato, Masashi; and Kikuchi, Hisashi, 4,695,143, Cl. 354-86.000.

Kikuchi, Kazuhiko: *See*—
Sawamura, Mitsuharu; Honguu, Kazuoki; and Kikuchi, Kazuhiko, 4,695,510, Cl. 428-336.000.

Kikuchi, Kenichi, to Sumitomo Electric Industries, Ltd. Process for making Schottky-barrier gate FET. 4,694,563, Cl. 437-40.000.

Kikuchi, Toshiyuki; and Yamamoto, Koichi, to Mazda Motor Corporation. Control of a vehicle automatic transmission. 4,694,709, Cl. 74-866.000.

Kikumoto, Ryoji: *See*—
Ninomiya, Kunihiro; Nitta, Issei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, 4,695,568, Cl. 514-258.000.

Kikumoto, Tadao; and Murakami, Isato, to Roland Kabushiki Kaisha. Synchronizing signal generator for musical instrument. 4,694,724, Cl. 84-1.030.

Kim, Han J.: *See*—
DeNuccio, Ron J.; Kim, Han J.; and Leung, Chi H., 4,694,558, Cl. 29-527.200.

Kim, Jin H., to Samsung Electronics Co., Ltd. Apparatus for quick starting tape in video cassette recorders. 4,695,906, Cl. 360-85.000.

Kim, Joo W. Automatic brightness control device. 4,695,885, Cl. 358-168.000.

Kim, Jung T.: *See*—
Nalewajek, David; Kim, Jung T.; and McCurry, Lynn E., 4,695,522, Cl. 429-206.000.

Kim, Kwan C. Clamping head for replaceable string mop. 4,694,524, Cl. 15-150.000.

Kim, Kwang S.: *See*—
Prince, Alfred M.; and Kim, Kwang S., 4,695,454, Cl. 424-89.000.

Kim, Sergei Y.: *See*—
Zhigalov, Gennady V.; Abduganiev, Abdurakhim; Kim, Sergei Y.; and Mosheev, Robert R., 4,694,642, Cl. 57-5.000.

Kimberly-Clark Corporation: *See*—
Westphal, Dean W.; and Strohbeen, David T., 4,694,978, Cl. 223-28.000.

Kimizuka, Junichi; Ushio, Yukihide; and Seto, Kaoru, to Canon Kabushiki Kaisha. Light source stabilizer with intensity and temperature control. 4,695,714, Cl. 250-205.000.

Kimmer, Klaus: *See*—
Ehle, Joachim; Fuchs, Gerhard; Kimmer, Klaus; and Langfeldt, Horst-Rudiger, 4,696,013, Cl. 373-71.000.

Kimoto, Katsumi, to Tokyo Shibaura Denki Kabushiki Kaisha. Optical disc apparatus with selective track accessing using a correction scale value. 4,695,989, Cl. 369-32.000.

Kimoto, Toshiyuki: *See*—
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.

Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaki, to Sumitomo Metal Mining Company Limited. Method of treating silicate ore containing gold and silver. 4,695,317, Cl. 75-24.000.

Kimura, Takeshi: *See*—
Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, 4,695,247, Cl. 431-352.000.

Kincaid, Donald M. Motorcycle passenger arm rest. 4,695,096, Cl. 297-417.000.

Kindig, James K.; and Reynolds, James E., to Integrated Carbons Corporation. Integrated coal cleaning process with mixed acid regeneration. 4,695,290, Cl. 44-1.0SR.

Kindsvater, Hans: *See*—
Omet, Reinhard; Kindsvater, Hans; and Wall, Hans J., 4,695,796, Cl. 324-226.000.

King-Seeley Thermos Co.: *See*—
Tarozzi, Richard A., 4,694,738, Cl. 99-279.000.

King, Timothy W. Asphalt handling apparatus. 4,695,186, Cl. 404-111.000.

Kinoshita, Kimiaki: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.

Kinshofer, Alfred. Two-sided grab bucket with plural operating cylinders. 4,695,086, Cl. 294-68.230.

Kinsley, Robert J., to Vogel Tool & Die Corporation. Tube cut off apparatus. 4,694,718, Cl. 83-319.000.

Kinugawa, Tadami: *See*—
Masumoto, Mituhiko; Yanada, Shigeo; and Kinugawa, Tadami, 4,695,620, Cl. 528-204.000.

Kishi, Hiroyasu, to Sanyo Electric Co., Ltd. Automatic hue correction circuit. 4,695,875, Cl. 358-28.000.

Kishi, Mitsuihiro, to Kabushiki Kaisha Hikoma Seisakusho. Lifting apparatus. 4,694,930, Cl. 182-2.000.

Kishita, Yoshihiro: *See*—
Inoue, Kazuhiko; Mitani, Tatsuro; and Kishita, Yoshihiro, 4,695,869, Cl. 357-71.000.

Kissel, Thomas R., to Eastman Kodak Company. Acid or acid salt wash of a metal chloride layer of an ion selective electrode. 4,695,362, Cl. 204-419.000.

Kisuzemi Innovacios Iroda: *See*—
Sinko, Tibor, 4,694,933, Cl. 182-128.000.

Kitagawa, Atsushi: *See*—
Kuwabara, Hideki; Kitagawa, Atsushi; and Sudo, Yoshimi, 4,695,593, Cl. 521-60.000.

Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, to Canon Kabushiki Kaisha. High range zoom lens. 4,695,133, Cl. 350-427.000.

Kitaguchi, Hiroshi: *See*—
Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, 4,695,525, Cl. 430-151.000.

Kitahara, Kazuki: *See*—
Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, 4,695,247, Cl. 431-352.000.

Kitamura, Masato: *See*—
Tanaka, Teruo; Tanaka, Teruya; and Kitamura, Masato, 4,695,484, Cl. 427-245.000.

Kitano, Kahei: *See*—
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Kitner, William M.; and Hart, James B. Watercraft stabilizing flotation structure. 4,694,770, Cl. 114-123.000.

Kito, Masahiro; and Mori, Katsuhiro, to Aisin Seiki Kabushiki Kaisha. Heat exchangers. 4,694,894, Cl. 165-135.000.

Kiziah, Floyd G. Drain. 4,694,513, Cl. 4-288.000.

Klauck, Manfred, to Flutec Fluidtechinische Gerate GmbH. Central body to which are connected both a driving motor and a pump. 4,695,232, Cl. 417-410.000.

Klebba, John M.; and Hultman, Kenneth L., to Geomation, Inc. Isothermal cavity and spark gap protection assembly for input/output connection terminals for electronic modules. 4,695,920, Cl. 361-118.000.

Klein, Mark S. Wheel spoke adjuster guard. 4,695,099, Cl. 301-37.0SA.

Klepsch, Wilhelm; and Plobst, Dietmar, to Senoplast Klepsch & Co. Thermoplastic sheet forming device. 4,695,239, Cl. 425-194.000.

Klimovskoe Spetsialnoe Konstruktorskoe Bjuro Po Proektirovaniju Tkatskogo Oborudovania: *See*—
Gendelman, Mikhail A.; Borodulin, Anatoly F.; Golubeva, Diana F.; and Bychkov, Sergei V., 4,694,867, Cl. 139-192.000.

Klockner-Humboldt-Deutz AG: *See*—
Haiduk, Klaus, 4,694,883, Cl. 164-186.000.

Kloiber, Gerald, to Siemens Aktiengesellschaft. Electrical resistor with a negative temperature coefficient for incremental resistance values and method for manufacturing same. 4,695,818, Cl. 338-22.00R.

Klopp, James L., to Cajon Company. Protective cap. 4,694,863, Cl. 138-96.00R.

Klunk, Thomas M.: *See*—
Grabbe, Dimitry; Korsunsky, Iosif; Klunk, Thomas M.; and DiOrazio, Joseph S., 4,695,111, Cl. 439-266.000.

Knape & Vogt Manufacturing Co.: *See*—
Sorenson, Robert E.; and Scriba, John M., Jr., 4,694,966, Cl. 211-88.000.

Knapp, Daniel R.: *See*—
Eller, Thomas D.; Halushka, Perry V.; Knapp, Daniel R.; and Mais, Dale, 4,695,647, Cl. 560-53.000.

Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., to Xerox Corporation. Process for ultra high quality images with magnetic developer composition. 4,695,524, Cl. 430-32.000.

Knauss, William F., Jr.; Pal, Uday B.; and Patil, Balaji V., to Allegheny Ludlum Corporation. Method of making steel. 4,695,318, Cl. 75-51.100.

Knebel & Rottger GmbH & Co.: *See*—
Knebel, Werner; and Sieberhagen, Gunter, 4,694,512, Cl. 4-192.000.

Knebel, Werner; and Sieberhagen, Gunter, to Knebel & Rottger GmbH & Co. Plumbing mixing circuit control apparatus for a combination set. 4,694,512, Cl. 4-192.000.

Kniskern, Peter J.: *See*—
Marburg, Stephen; Tolman, Richard L.; and Kniskern, Peter J., 4,695,624, Cl. 530-395.000.

Knoblauch, Karl: *See*—
Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, 4,695,444, Cl. 423-569.000.

Knox, Ronald A. Safety hanger for mud flaps. 4,695,070, Cl. 280-154.50R.

Knudsen, Christian W.: *See*—
Stahl, Charles R.; Gibson, Michael A.; and Knudsen, Christian W., 4,694,907, Cl. 166-303.000.

Ko, Eric: *See*—
Zivitz, Maury; Ko, Eric; and Eslick, Mark, 4,695,164, Cl. 356-427.000.

Kobayashi, Bujirou: *See*—
Kodai, Syojiro; Fujii, Noriaki; Gamo, Hiroshi; and Kobayashi, Bujirou, 4,695,925, Cl. 361-395.000.

Kobayashi, Daisaku; Itaba, Tunesaku; and Momose, Yutaka, to Kabushiki Kaisha Riken; and Aisin Seiki Kabushiki Kaisha. Rod seal device for stirling engines. 4,694,707, Cl. 74-606.00A.

Kobayashi, Katsumi: *See*—
Nakajima, Takayuki; Aoki, Tetsuo; Kobayashi, Katsumi; and Akiyama, Noboru, 4,696,004, Cl. 371-25.000.

Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle suspension apparatus. 4,695,074, Cl. 280-707.000.

Kobayashi, Kiyoshi: *See*—
Komatsu, Teruaki; Kobayashi, Kiyoshi; Tatsu, Kunihiko; and Shibata, Shoichi, 4,695,065, Cl. 279-60.000.

Kobayashi, Kouzou. Tea-containing tobacco. 4,694,842, Cl. 131-359.000.

Kobayashi, Michiaki: *See*—
Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, 4,694,749, Cl. 101-426.000.

Kobayashi, Mitsuo: *See*—
Sagisawa, Shinobu; Takahama, Teizo; and Kobayashi, Mitsuo, 4,695,963, Cl. 364-513.000.

Kobayashi, Yoshinao: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Koch, Frederick W.; and Pialet, Joseph W., to Lubrizol Corporation, The. Reaction product of polyalrylene-substituted polycarboxylic acid acylating agent, polysmine and sulfolene as a dispersant. 4,695,390, Cl. 252-47.500.

Kodai, Syojiro; Fujii, Noriaki; Gamo, Hiroshi; and Kobayashi, Bujirou, to Mitsubishi Denki Kabushiki Kaisha. IC card. 4,695,925, Cl. 361-395.000.

Kodama, Hisashi; and Okabe, Yoshio, to Aisin Seiki Kabushiki Kaisha. Automatic tensioner having locking mechanism. 4,695,268, Cl. 474-110.000.

Kodama, Masahiro; Sakae, Tatsuya; and Urano, Yoshio, to Daikin Industries, Ltd. High speed memory access circuit of CRT display unit. 4,695,967, Cl. 364-521.000.

Kodera, Hiroyuki: *See*—
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.

Koerner, Norman D.: *See*—
Brooks, Royce L., 4,695,072, Cl. 280-650.000.

Koitabashi, Takatoshi, to Sanden Corporation. Electromagnetic clutch with an improved magnetic rotatable member. 4,694,945, Cl. 192-84.00C.

Koito Seisakusho Co., Ltd.: *See*—
Uchida, Kihachirou, 4,695,259, Cl. 439-271.000.

Koizumi, Toshiaki, to Pioneer Electronic Corporation. Front loading disk player with improved disk sensor positioning. 4,695,995, Cl. 369-75.200.

Koken Co., Ltd.: *See*—
Miyata, Teruo; and Noishiki, Yasuharu, 4,695,281, Cl. 623-11.000.

Kokura, Yasuhide: *See*—
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.

Kokusai Denshin Denwa Co., Ltd.: *See*—
Wada, Masahiro; and Yamaguchi, Hirohisa, 4,695,882, Cl. 358-136.000.

Kolbenschmidt AG: *See*—
Mielke, Siegfried, 4,694,813, Cl. 123-668.000.

Kollonitsch, Janos; and Patchett, Arthur A., to Merck & Co., Inc. Fluorinated amino acids. 4,695,588, Cl. 514-538.000.

Kollross, Gunter. Process and device for the fixture of suspension elements to sausages. 4,694,537, Cl. 17-49.000.

Komaki, Shojiro: *See*—
Watanabe, Fumio; Komaki, Shojiro; Miyamoto, Masao; and Ito, Takao, 4,695,724, Cl. 250-292.000.

Komatsu, Teruaki; Kobayashi, Kiyoshi; Tatsu, Kunihiko; and Shibata, Shoichi, to Matsushita Electric Works, Ltd. Keyless chuck for rotary tool. 4,695,065, Cl. 279-60.000.

Komatsubara, Masahiro; Kamimura, Tetsuro; Inanaga, Takugi; and Takahashi, Akira, to Pioneer Electronic Corporation. Cassette tape machine. 4,695,011, Cl. 242-199.000.

Komatsuzaki, Takeshi: *See*—
Ogano, Takeo; Komatsuzaki, Takeshi; Shigenari, Ryoichi; and Uesugi, Naomoto, 4,694,942, Cl. 192-13.00A.

Komba, Toshinori: *See*—
Kanai, Hideo; Komba, Toshinori; and Mogi, Eiji, 4,694,571, Cl. 29-806.000.

Komitor, Greg A.: *See*—
Friedlander, Randal H.; Nash, Sheryl A.; and Komitor, Greg A., 4,695,493, Cl. 428-40.000.

Komura, Fuminobu: *See*—
Seto, Youichi; Homma, Koichi; Komura, Fuminobu; and Ota, Hideo, 4,695,964, Cl. 364-518.000.

Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, to Toyo Boseki Kabushiki Kaisha. Permselective membrane. 4,695,383, Cl. 210-500.370.

Kondo, Kazuo; Ishiguro, Nobuya; and Tada, Teruo, to Okura Industrial Co., Ltd. Heat-shrinkable composite packaging film. 4,695,491, Cl. 428-35.000.

Kondo, Mitsuo, to Fuji Photo Optical Co., Ltd. Air feed control device for an endoscope. 4,694,821, Cl. 128-4.000.

Kongskilde Koncerneiskab A/S: *See*—
Hansen, Jens O. E., 4,695,206, Cl. 406-65.000.

Konishi, Takeshi: *See*—
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Koper, Kenneth T.; Willard, Sylvester L.; and Abramowski, Larry A., to United States of America, Navy. Electrochemical reserve battery. 4,695,520, Cl. 429-116.000.

Koppe, Lou W. Foldable closure for flexible bags comprising flat sheet with integral axial hinge groove, lead in notch, and gripping aperture. 4,694,542, Cl. 24-30.50S.

Korsunsky, Iosif: *See*—
Grabbe, Dimitry; Korsunsky, Iosif; Klunk, Thomas M.; and DiOrazio, Joseph S., 4,695,111, Cl. 439-266.000.

Kortmann, Heinrich; and Bock, Wolfgang, to Studiengesellschaft fur Eisenerzaufbereitung. Method of minimizing reduction disintegration of iron ores and iron ore agglomerates to be used as blast furnace burden. 4,695,315, Cl. 75-0.50R.

Korzekwa, Tadeusz M.; McMurtry, Carl H.; and Boecker, Wolfgang D. G., to Stemcor Corporation. Vibratory grinding of silicon carbide. 4,695,294, Cl. 51-307.000.

Kos, Joseph M.: *See*—
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., 4,695,736, Cl. 290-44.000.

Kosa, Nadhir B., to GV Medical, Inc. Fiber tip monitoring and protection assembly. 4,695,697, Cl. 219-121.0LZ.

Koseki, Yuji: *See*—
Ishikawa, Kazumasa; and Koseki, Yuji, 4,695,898, Cl. 358-296.000.

Kosley, Raymond W., Jr.; and Cherill, Robert J., to Hoechst-Roussel Pharmaceuticals Inc. Intermediates for spiro[2H-1,4 benzodioxepin-3(5H)4'-piperidine and -3'-pyrrolidine] compounds. 4,695,637, Cl. 546-207.000.

Koster, Ole: *See*—
Bech, Marcus C.; and Koster, Ole, 4,694,637, Cl. 53-448.000.

Kotaka, Fumitaka; and Maeda, Takanori, to Pioneer Electronic Corporation. Focus error detector. 4,695,158, Cl. 356-123.000.

Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, to Sumitomo Chemical Company, Limited. Method for purifying 1-aminoanthraquinone. 4,695,407, Cl. 760-378.000.

Kotzmann, Heinz. Combustion process with ionization control. 4,695,245, Cl. 431-9.000.

Kouno, Tomomitsu: *See*—
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.

Kovacs, Magda, nee Kalman: *See*—
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.

Kovacs nee Kalman, Magda: *See*—
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

Kovats, Tibor F. I.: *See*—
Sinclair, William J.; Kovats, Tibor F. I.; and Straus, Jozef, 4,695,125, Cl. 350-96.200.

Kowal, Steven J., to Stanadyne, Inc. Inverted bucket tappet with collapsing diaphragm seal. 4,694,790, Cl. 123-90.580.

Koyabu, Kunihiro, to NEC Corporation. Semiconductor integrated circuit device. 4,695,866, Cl. 357-42.000.

Koyama, Mototsugu: *See*—
Hayashi, Souichi; Miyake, Johji; Koyama, Mototsugu; and Sakaguchi, Kanji, 4,695,329, Cl. 148-3.000.

Kozawa, Tadashi: *See*—
Nomura, Yoshihisa; Suda, Koichi; and Kozawa, Tadashi, 4,694,734, Cl. 92-130.00R.

Koziol, Konrad, to Conradty GmbH & Co. Metallelektroden KG. Electrode for membrane electrolysis. 4,695,355, Cl. 204-252.000.

Kozuki, Susumu: *See*—
Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, 4,696,008, Cl. 371-47.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Purcaru, Bebe-Titu, 4,695,228, Cl. 416-223.00A.

Krakau, Herbert B.: *See*—
Morganstein, Sanford J.; Tuck, Edward F.; Mehta, Bakulesh A.; and Krakau, Herbert B., 4,696,028, Cl. 379-88.000.

Kramer, David M.; Compton, Russell A.; Strenk, Lawrence M.; and Murdoch, James B., to Technicare Corporation. Non harmonic NMR spin echo imaging. 4,695,800, Cl. 324-309.000.

Kraus, Charles E., to Excelermatic Inc. Infinitely variable traction roller transmission. 4,694,704, Cl. 74-200.000.

Krenitsky, Thomas A., to Burroughs Wellcome Co. Antiviral compound use. 4,695,570, Cl. 514-261.000.

Krieger, Karl; and Reinelt, Werner, to Hermann Hemschedit Maschinenfabrik GmbH & Co. Prop control valve. 4,694,730, Cl. 91-170.0MP.

Krueger, Robert H.: *See*—
Fildes, John M.; and Krueger, Robert H., 4,694,686, Cl. 73-104.000.

Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Arthropodicidal phosphorus-containing heterocycles. 4,695,563, Cl. 514-105.000.

Krumeich, Jorg H. Solution of alpha-chymotrypsin. 4,695,458, Cl. 424-94.000.

Krumme, John F., to Metcal, Inc. Autoregulating, electrically shielded heater. 4,695,713, Cl. 219-553.000.

Krupp Polysius AG: *See*—
Henne, Heinrich; Blasczyk, Gotthardt; Eickholt, Hubert; and Lohnherr, Ludger, 4,694,994, Cl. 241-79.100.

Kubala, Gregory, to Dowell Schlumberger Incorporated. Aqueous gelling and/or foaming agents for aqueous acids and methods of using the same. 4,695,389, Cl. 252-8.553.

Kubo, Kazuo: *See*—
Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, 4,695,233, Cl. 418-83.000.

Kuboki, Hitoshi: *See*—
Shinno, Kouji; and Kuboki, Hitoshi, 4,695,276, Cl. 604-283.000.

Kubota, Shinichi: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.

Kubozuka, Takao: *See*—
Hirano, Yoshinori; and Kubozuka, Takao, 4,694,784, Cl. 123-41.120.

Kudou, Takenori, to Nippon Steel Corporation. Lance supporting apparatus. 4,695,042, Cl. 266-226.000.

Kuechenmeister, Rodney D.: *See*—
Murphy, Robert E.; Ballard, Gary R.; and Kuechenmeister, Rodney D., 4,694,953, Cl. 198-627.000.

Kuei-Wen, Sheu. Electric perpetual calendar. 4,694,597, Cl. 40-117.000.

Kuhl, Ulrich: *See*—
Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, 4,695,566, Cl. 514-234.000.

Kuhl, Wilfried: *See*—
Grosse, Joachim; Hess, Ruediger; Kuhl, Wilfried; and Mueller, Reiner, 4,695,687, Cl. 200-144.00B.

Kuhn S.A.: *See*—
Ermacora, Rino; and Jehl, Patrice, 4,694,640, Cl. 56-16.400.

Kulig, Frank M., to J. M. Ney Company, The. Apparatus and method for localized heating of an object at precise temperatures. 4,695,705, Cl. 219-354.000.

Kulite Semiconductor Products, Inc.: *See*—
Kurtz, Anthony D.; and Mallon, Joseph R., 4,695,817, Cl. 338-4.000.

Kulpa, William G.: *See*—
Blevins, Ballard J.; Kulpa, William G.; Mathis, Joseph R.; and McCullough, John W., 4,695,948, Cl. 364-200.000.

Kumagai, Naotake: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Kumagai, Yasuo: *See*—
Era, Yoshiyuki; and Kumagai, Yasuo, 4,695,178, Cl. 403-14.000.

Kumamoto, Toshio, to Mitsubishi Denki Kabushiki Kaisha. Comparing device. 4,695,748, Cl. 307-355.000.

Kumar, Ajith K., to General Electric Company. Loss of electrical feedback detector. 4,695,941, Cl. 364-165.000.

Kumashiro, Kenji: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Kumobayashi, Hidenori: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Kung, Peter: *See*—
Dabisch, Wolfgang H.; Kung, Peter; Muller, Siegfried R.; and Narayanan, Krishnamoorthy, 4,695,528, Cl. 430-290.000.

Kuo-Ching, Huang; and Yong-Hung, Lin. Shedding device for a circular weaving machine. 4,694,866, Cl. 139-13.00R.

Kuo, Youti. Dentifrice dispensing toothbrush. 4,695,177, Cl. 401-150.000.

Kurakake, Mitsuo; Sakamoto, Keiji; and Toyosawa, Yukio, to Fanuc Ltd. Servomotor velocity control system. 4,695,780, Cl. 318-561.000.

Kuramoto, Terumasa: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Kuraoka, Koji: *See*—
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.

Kuriyama, Akimasa: *See*—
Fukumizu, Shinnichi; Inoue, Kimio; and Kuriyama, Akimasa, 4,695,165, Cl. 366-90.000.

Kurokawa, Ryogo; Oyama, Fusami; and Takahashi, Akira, to Fuji Jukogyo Kabushiki Kaisha. Steering system for rear wheels. 4,695,069, Cl. 280-91.000.

Kurosawa, Atsushi: *See*—
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.

Kurosawa, Hideyuki: *See*—
Satoh, Hidetaka; Kurosawa, Hideyuki; Kamijoh, Yoshiaki; and Jyumonji, Hiromichi, 4,695,916, Cl. 361-56.000.

Kurosawa, Yukio; and Iwashita, Kiyoji, to Hitachi, Ltd. Vacuum circuit breaker. 4,695,689, Cl. 200-144.00B.

Kursar, James V., to Ingersoll-Rand Company. Clearance pocket assembly. 4,694,732, Cl. 92-60.500.

Kurtz, Anthony D.; and Mallon, Joseph R., to Kulite Semiconductor Products, Inc. Environmentally protected pressure transducers employing two electrically interconnected transducer arrays. 4,695,817, Cl. 338-4.000.

Kushida, Noritaka: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.

Kuster & Co. GmbH: *See*—
Hornivius, Lothar, 4,694,610, Cl. 49-351.000.

Kutelia, Elgudzha R.: *See*—
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.

Kuusi, Juhani, to Robotest Oy. Procedure and means for measuring with aid of an x-ray tube the distribution of fillers or equivalent in a web. 4,696,023, Cl. 378-46.000.

Kuwabara, Hideki; Kitagawa, Atsushi; and Sudo, Yoshimi, to Japane Styrene Paper Corporation. Prefoamed propylene polymer-base particles, expansion-molded article produced from said particles and production process of said article. 4,695,593, Cl. 521-60.000.

Kuzumoto, Hideshi: *See*—
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.

Kuzushita, Hirokazu: *See*—
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.

Kwon, Young J.: *See*—
Lahoda, Edward J.; Burgman, Herbert A.; and Kwon, Young J., 4,695,441, Cl. 423-347.000.

Kwong, Chung T., to Amerasia International Technology, Inc. Hyperconductive filled polymers. 4,695,404, Cl. 252-514.000.

Kyan, Chwan P.: *See*—
Graziani, Kenneth R.; Kyan, Chwan P.; Shih, Stuart S.; and Sowiak, Raymond M., 4,695,364, Cl. 208-59.000.

Kyniak, William J., to Switchcraft, Inc. Jack module and jackfield. 4,695,117, Cl. 439-188.000.

L. & C. Steinmuller GmbH: *See*—
Pollak, Gerd, 4,694,893, Cl. 165-104.340.
Premel, Ulrich; Dorling, Rolf; and Schultze, Manfred, 4,694,782, Cl. 122-7.00R.
Thones, Gustav, 4,694,897, Cl. 165-160.000.

La Telemecanique Electrique: *See*—
Bochard, Michel; and Lafaye, Michel, 4,695,684, Cl. 200-43.070.

Labrum, Joseph H., to Sperry Corporation. Acousto-optic R-F receiver which is tunable and has adjustable bandwidth. 4,696,061, Cl. 455-609.000.

LaBudde, Edward V. Fiber optic switching system and method. 4,696,062, Cl. 455-612.000.

Lacey, David: *See*—
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

Lacourse, Norman L.: *See*—
Zwiercan, Gary A.; Lacourse, Norman L.; and Lenchin, Julianne M., 4,695,475, Cl. 426-582.000.

Lacroix, Roger; Adam, Jean-Marie; and Vincze, Janos, to Ciba-Geigy Corporation. Anthraquinone compounds and the production and use thereof. 4,695,406, Cl. 260-372.000.

Lafaye, Michel: *See*—
Bochard, Michel; and Lafaye, Michel, 4,695,684, Cl. 200-43.070.

Lahoda, Edward J.; Burgman, Herbert A.; and Kwon, Young J., to Westinghouse Electric Corp. Manufacture of silane. 4,695,441, Cl. 423-347.000.

Lalere, Jean-Christophe: *See*—
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, 4,694,585, Cl. 33-502.000.

Lam, D. K. W.: *See*—
MacDonald, R. I.; Lam, D. K. W.; and Jenkins, R. W., 4,696,059, Cl. 455-600.000.

Lam, Nim C., to Fairchild Semiconductor Corporation. Emitter-coupled logic multiplexer. 4,695,749, Cl. 307-455.000.

Lambarelli, Livio: *See*—
Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, 4,696,001, Cl. 370-88.000.

Lambert, Charles: *See*—
Cuneo, Carol A.; and Lambert, Charles, 4,695,474, Cl. 426-579.000.

Lambert, Earl B. Security bar system for louvered window units. 4,694,608, Cl. 49-50.000.

Lambertz, Johannes; and Schumacher, Ingo, to Rheinische Braunkohlenwerke AG. Probe devices. 4,695,789, Cl. 324-61.00P.

Lamiraux, Christian, to MLR Electronic. Method for processing radio signals for radionavigation and receiver for carrying out the said method. 4,695,843, Cl. 342-417.000.

Lampas, Heide: *See*—
Geissler, Ulrich; and Lampas, Heide, 4,695,527, Cl. 430-256.000.

Lander, Lynn H.: *See*—
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.

Landers, Jerry L., to Servend International, Inc. Ice dispenser with an upwardly inclined channeled ramp and two part auger. 4,694,661, Cl. 62-344.000.

Lane, Robert C.; and Lee, Joseph M. Rotary release ice machine and method. 4,694,656, Cl. 62-72.000.

Lange, Gerhard: *See*—
Rudy, Willi; and Lange, Gerhard, 4,694,644, Cl. 59-27.000.

Lange, Peter M.: *See*—
Oeckl, Siegfried; Mitschker, Alfred; Lange, Peter M.; and Martinola, Friedrich, 4,695,556, Cl. 502-11.000.

Langen, Manfred, to W. Schlafhorst & Co. Method and device for exchanging empty cans with cans filled with sliver. 4,694,539, Cl. 19-159.00A.

Langfeldt, Horst-Rudiger: *See*—
Ehle, Joachim; Fuchs, Gerhard; Kimmer, Klaus; and Langfeldt, Horst-Rudiger, 4,696,013, Cl. 373-71.000.

Langner, Arnd M.: *See*—
Schleupen, Richard; Mayer, Ulrich; Bauer, Bernhard; and Langner, Arnd M., 4,696,002, Cl. 371-12.000.

Lanier, David M.: *See—*
Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., 4,695,246, Cl. 431-31.000.

Larassay Holding AG: *See—*
Mayor, Jean-Michel; Steffen, Jurg; and Wuthrich, Peter, 4,695,698, Cl. 219-121.00L.

Larkin, Keith J., to U.S. Philips Corporation. Ionization chamber. 4,695,731, Cl. 250-374.000.

Laser Magnetic Storage International Company: *See—*
Steenbergen, Christiaan; Howard, Peter G.; Bracht, Roger R.; and van der Put, Henk, 4,695,994, Cl. 369-54.000.

Latanzi, Lewis A.: *See—*
Schoenbaum, Gary L.; Latanzi, Lewis A.; Hedrick, Stephen L.; and Johnson, Harold V., 4,695,157, Cl. 356-237.000.

Latham, Paul W., II, to Data General Corporation. Apparatus increasing diode switching speeds. 4,695,747, Cl. 307-317.00R.

Lau, John J. Semiconductor wafer transfer apparatus. 4,695,217, Cl. 414-404.000.

Lau, Kreisler S. Y.; and Kelleghan, William J., to Hughes Aircraft Company. Ethynylthiophenoxy derivatives of diphenylhexafluoropropane. 4,695,655, Cl. 568-56.000.

Lau, Robert S.; Murphy, Roy E.; and Quick, Robert G., Jr., to Azuray Inc. Digital multi-beam CRT controller. 4,695,772, Cl. 315-370.000.

Laue, Karl H.: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Lauk, Willi, to Allpack Industrielle Lohnverpackung GmbH & Co. KG. Pharmaceutical adhesive plaster and method for manufacturing it. 4,695,277, Cl. 604-304.000.

Laurent, Sebastian M.; and Sanders, Robert N., to Ethyl Corporation. Bone disorder treatment. 4,695,461, Cl. 424-154.000.

Laurent, Yves: *See—*
Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, 4,695,432, Cl. 422-98.000.

Lawrence, Alvah A.; and Neves, Jason W., to Raychem Corp. Cable blocking and block splice protection. 4,695,676, Cl. 174-22.00R.

Lawrence, David R. Bench system for repairing automobiles. 4,694,674, Cl. 72-305.000.

Lawrence, William A. P., to Cemco, Inc. Self-adjusting control valve for elevators. 4,694,935, Cl. 187-111.000.

Lawson, Michael I., to Procter & Gamble Company, The. Absorbent article having dual cuffs. 4,695,278, Cl. 604-385.00A.

Leach Corporation: *See—*
Jackson, Kenneth R.; and Tofigh, Farshid, 4,695,917, Cl. 361-58.000.

Leaney, Peter A.: *See—*
Russell, Michael K.; Wesenberg, Donald L.; and Leaney, Peter A., 4,694,555, Cl. 29-451.000.

Lear Siegler, Inc.: *See—*
Routson, Gregory S., 4,694,703, Cl. 74-5.00F.

Learn, Arthur J.; and DuBois, Dale R., to Anicon, Inc. Chemical vapor deposition wafer boat. 4,694,778, Cl. 118-728.000.

Leber, David C.; and Falk, Timothy L., to Tektronix, Inc. Printed polymer circuit board method. 4,694,572, Cl. 29-840.000.

Lebizay, Gerald, to International Business Machines Corporation. Cross-point switch of multiple autonomous planes. 4,695,999, Cl. 370-58.000.

Lebowitz, Joseph, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Method of making high-performance trench capacitors for DRAM cells. 4,694,561, Cl. 437-52.000.

Lederman, Elsie J. Computer furniture. 4,695,104, Cl. 312-26.000.

Lee, Frank: *See—*
Yokota, Takashi; Lee, Frank; Rennick, Donna; and Arai, Ken-ichi, 4,695,542, Cl. 435-68.000.

Lee, Joseph M.: *See—*
Lane, Robert C.; and Lee, Joseph M., 4,694,656, Cl. 62-72.000.

Lee, William. Skin protective pad. 4,695,496, Cl. 428-95.000.

Lees, David E. B.; and Merchant, John, to Honeywell Inc. Passive range measurement apparatus and method. 4,695,959, Cl. 364-458.000.

Legg, James R.: *See—*
Stanton, James R.; and Legg, James R., 4,695,114, Cl. 439-573.000.

Lehnert, Charles W.: *See—*
Fowler, George F., Jr.; and Lehnert, Charles W., 4,695,494, Cl. 428-71.000.

Lehr, Adolf: *See—*
Ehrhardt, Winfried; Richter, Klaus; and Lehr, Adolf, 4,695,047, Cl. 269-309.000.

Leibinsohn, Saul. Fluid control device particularly useful in liquid transfusion apparatus. 4,694,856, Cl. 137-555.000.

Leinfelder, Klaus, to Cullmann Handelsgesellschaft fur Verbrauchsgutter mbH. Support stand with adjustable legs. 4,695,021, Cl. 248-168.000.

Lekholm, Anders, to Siemens Aktiengesellschaft. Heart pacemaker with respiratory signal generation capability. 4,694,830, Cl. 128-419.0PG.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Steinman, Lawrence; Waldor, Matthew K.; Sriram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., 4,695,459, Cl. 424-95.000.

Lemo M. Lehmacher & Sohn GmbH Maschinenfabrik: *See—*
Dreckmann, Karl; Schneider, Jakob; and Theuner, Hans-Werner, 4,695,346, Cl. 156-361.000.

Lenchin, Julianne M.: *See—*
Zwiercan, Gary A.; Lacourse, Norman L.; and Lenchin, Julianne M., 4,695,475, Cl. 426-582.000.

Lennox Industries, Inc.: *See—*
Beilfuss, Robert C.; Lanier, David M.; Bammel, Stanley E.; Huang, Terry J.; and Banks, David M., 4,695,246, Cl. 431-31.000.

Leon, Albert M., to Stauffer Chemical Company. Autothermal process for the production of carbon disulfide and hydrogen sulfide. 4,695,443, Cl. 423-443.000.

Leonard, Raymond G.; and Harris, Stephen J., to Loctite (Ireland) Limited. Instant adhesive composition utilizing mixed functionality calixarenes as accelerators. 4,695,615, Cl. 526-194.000.

Leopoldi, Norbert: *See—*
Heinrich, William P.; and Leopoldi, Norbert, 4,694,581, Cl. 33-169.00R.

Leppert, James B. Integrated circuit sockets. 4,695,107, Cl. 439-83.000.

Lermer Packaging Corp.: *See—*
Proctor, John D.; Towns, Edward J.; and Brown, Edward M., 4,694,968, Cl. 215-224.000.

Leslie Hartridge Limited: *See—*
Downham, David, 4,694,671, Cl. 72-26.000.

Lessard, William W.: *See—*
Levene, Martin M.; and Lessard, William W., 4,694,719, Cl. 83-451.000.

Leth-Olson, Henrik; and Marot, Lajos K. D., to Aktieselskabet Laur.-Knudsen Nordisk Elektricitets Selskab. Switch housing having fixed external nuts for attachment of contacts and terminals. 4,695,691, Cl. 200-303.000.

Leung, Chi H.: *See—*
DeNuccio, Ron J.; Kim, Han J.; and Leung, Chi H., 4,694,558, Cl. 29-527.200.

Leung, Wan L.: *See—*
Brandt, Henry R.; Gannon, Patrick M.; Leung, Wan L.; and Marchini, Timothy R., 4,695,950, Cl. 364-200.000.

Leung, Wu-Hon F.: *See—*
Hansen, Terris L.; Hyatt, Wayne E.; and Leung, Wu-Hon F., 4,695,977, Cl. 364-900.000.

LeVeen, Eric G.; and LeVeen, Robert F. Apparatus and method of quantifying hemostasis using oscillations from a transducer immersed in the blood sample. 4,695,956, Cl. 364-416.000.

LeVeen, Robert F.: *See—*
LeVeen, Eric G.; and LeVeen, Robert F., 4,695,956, Cl. 364-416.000.

Levene, Martin M.; and Lessard, William W., to Ontario Die Company Limited. Vacuum die cutting apparatus. 4,694,719, Cl. 83-451.000.

Lever Brothers Company: *See—*
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.
Hight, Andrew T., 4,695,284, Cl. 8-137.000.

Levine, Marc S., to United DC. Pneumatic conveying system. 4,695,205, Cl. 406-38.000.

Levine, Michael R.; Russo, James T.; Cairo, Anthony C.; and Rigotti, Victor H., to Honeywell Inc. Manual switch for altering a parameter in opposite directions based on length of time of switch actuation. 4,695,942, Cl. 364-188.000.

Levine, Peter A.; Cobb, Arthur L., Jr.; Johnson, Cydney A.; and Peterson, Gary R., to RCA Corporation. Color television camera with selectively removable infrared rejection filter. 4,695,878, Cl. 358-44.000.

Levine, Robert A.: *See—*
Wardlaw, Stephen C.; Levine, Robert A.; Rodriguez, Rodolfo R.; and Loken, Michael R., 4,695,553, Cl. 436-177.000.

Levkov, Biagoje: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Levy, Allan, to Siemens Corporate Research & Support, Inc. Voice switched gain system. 4,696,032, Cl. 379-390.000.

Levy, Uri: *See—*
Gordon, Eugene I.; and Levy, Uri, 4,695,332, Cl. 437-126.000.

Leybold-Heraeus GmbH: *See—*
Caspar, Hans-Peter; and Schutz, Gunter, 4,695,223, Cl. 415-90.000.

Li, Hsin L.; and Prevorsek, Dusan C., to Allied Corporation. Apparatus for extruding small quantities of material. 4,695,240, Cl. 425-207.000.

Libin, Bernard, to Novatome. Double-wall tube for a heat exchanger. 4,694,864, Cl. 138-113.000.

Licentia Patent-Verwaltungs-GmbH: *See—*
Jehle, Franz; and Meinel, Holger, 4,695,842, Cl. 342-59.000.

Lichtenberg, Norman B.; and Chaczyk, Adam W., to Acco Babcock Inc. Control cable conduit length adjustment device. 4,694,706, Cl. 74-501.50R.

Liebel-Flarsheim Company: *See—*
Goethel, James H., 4,695,271, Cl. 604-49.000.

Lieberman, Benjamin. Method for processing coal preparation plant washings for elimination of sludge ponds. 4,695,324, Cl. 106-96.000.

Liedtke, Kurt: *See—*
Focke, Heinz; and Liedtke, Kurt, 4,694,714, Cl. 83-13.000.

Lilja, Per O.: *See—*
Ekelund, Folke J. B.; Lilja, Per O.; Wald, Roland J. E.; and Stahl, Matts F., 4,695,413, Cl. 361-18.000.

Lin, Yui-Chen. Universal couch. 4,694,517, Cl. 5-114.000.

Lindberg, Robert C. Removable belt-backing mechanism for a belt sander. 4,694,616, Cl. 51-170.0EB.

Lindberg, Verne L.; and Stockinger, Paul A., to Aickin Development Corporation. Non-metallic strut system. 4,695,019, Cl. 248-74.300.

Linde Aktiengesellschaft: *See*—
Becker, Hans; and Linde, Gerhard, 4,695,349, Cl. 203-26.000.
Sapper, Rainer, 4,695,304, Cl. 62-27.000.

Linde, Gerhard: *See*—
Becker, Hans; and Linde, Gerhard, 4,695,349, Cl. 203-26.000.

Lindenbaum, Bernard. Aerial load-lifting system. 4,695,012, Cl. 244-26.000.

Lindholm, Carl-Henrik; and Lundstrom, Christer, to Asea Aktiebolag. Industrial robot installation. 4,695,027, Cl. 248-325.000.

Lindig, Markus: *See*—
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.

Lindner, Manfred: *See*—
Bardl, Artur; and Lindner, Manfred, 4,695,804, Cl. 328-14.000.

Lindner, Philip A.: *See*—
Anthony, Thomas R.; Lindner, Philip A.; and Tucker, Jewell G., 4,695,760, Cl. 313-348.000.

Lindstrom, Richard L.; Doughman, Donald J.; and Skelnik, Debra. Corneal storage system. 4,695,536, Cl. 435-1.000.

Linick, Bruce: *See*—
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.

Linkies, Adolf: *See*—
Clauss, Karl; Linkies, Adolf; and Reuschling, Dieter, 4,695,629, Cl. 544-2.000.

Linquist, Robert L.: *See*—
Jorgensen, Walter E.; and Linquist, Robert L., 4,694,848, Cl. 137-114.000.

Lippman, Richard D., to California Health Technologies. Method for retarding aging. 4,695,590, Cl. 514-724.000.

Liquid Carbonic Corporation: *See*—
Tyree, Lewis, Jr., 4,695,302, Cl. 62-10.000.

Litton Systems, Inc.: *See*—
Chang, Chin-Lung; and Feth, John R., 4,695,123, Cl. 350-96.150.

Liu, Leland L.; and Touhsaent, Robert E., to Mobil Oil Corporation. Coated, oriented, polymer film laminate. 4,695,503, Cl. 428-207.000.

LNP Corporation: *See*—
Crosby, Jane M.; and Hutchins, MaryGail K., 4,695,602, Cl. 524-439.000.

Locke, Reginald A. J. Modular building connecting means. 4,694,621, Cl. 52-79.130.

Lockheed Corporation: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.

Lockwood, James M.: *See*—
Cabaniss, Frank W.; and Lockwood, James M., 4,695,808, Cl. 331-57.000.

Loctite (Ireland) Limited: *See*—
Leonard, Raymond G.; and Harris, Stephen J., 4,695,615, Cl. 526-194.000.

Lohnherr, Ludger: *See*—
Henne, Heinrich; Blaszcyk, Gotthardt; Eickholt, Hubert; and Lohnherr, Ludger, 4,694,994, Cl. 241-79.100.

Loken, Michael R.: *See*—
Wardlaw, Stephen C.; Levine, Robert A.; Rodriguez, Rodolfo R.; and Loken, Michael R., 4,695,553, Cl. 436-177.000.

Long, Charles A., Jr., to Long Enterprises, Inc. Apparatus and process for rapid sewage sludge separation. 4,695,388, Cl. 210-760.000.

Long Enterprises, Inc.: *See*—
Long, Charles A., Jr., 4,695,388, Cl. 210-760.000.

Long, Kenneth A.: *See*—
Chase, Thomas L.; and Long, Kenneth A., 4,695,045, Cl. 269-152.000.

Longreen Limited: *See*—
Hung, Lam H., 4,694,815, Cl. 124-27.000.

Loos, Herbert; and Erhardt, Manfred, to Carl Hurth Maschinen und Zahnradfabrik GmbH & Co. Method for the precision working of the tooth system of bevel gears. 4,694,617, Cl. 51-287.000.

Loosen, Ron. Floppy diskette protection device. 4,695,911, Cl. 360-133.000.

L'Oreal: *See*—
Kalopissis, Gregoire; and Vanlerberghe, Guy, 4,695,653, Cl. 564-505.000.

Lorenz Bolz GmbH & Co.: *See*—
Balleis, Peter, 4,695,263, Cl. 446-256.000.

Lowi, Alvin, Jr. Compression ignition engine fumigation system. 4,694,802, Cl. 123-431.000.

Lown, Harold, to General Electric Company. Centrifugal compressor with injection of a vaporizable liquid. 4,695,224, Cl. 415-116.000.

Lowry, Stephen R.: *See*—
Brierley, Philip R.; and Lowry, Stephen R., 4,695,727, Cl. 250-328.000.

Lubrizol Corporation, The: *See*—
Koch, Frederick W.; and Pialet, Joseph W., 4,695,390, Cl. 252-47.500.

Lucas Industries Limited: *See*—
Yardley, Alfred; and Pickering, John F., 4,694,651, Cl. 60-578.000.

Lucas Industries Public Limited Company: *See*—
Bowsher, Glynne T., 4,695,819, Cl. 338-153.000.
Pruneda, Domingo C., 4,694,795, Cl. 123-373.000.

Lucassen, Guenter: *See*—
Pinto, Akiva; and Lucassen, Guenter, 4,694,538, Cl. 19-105.000.

Luccarelli, Domenick, Jr.: *See*—
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., 4,695,473, Cl. 426-535.000.

Luhrmann, Johannes: *See*—
Dreyer, Heinz; Scheufler, Bernd; Wiemeyer, Benno; and Luhrmann, Johannes, 4,694,759, Cl. 111-85.000.

Lukich, James L.; and Zarkovacki, John. Cabinet having a retractable bed. 4,694,518, Cl. 5-136.000.

Lum, Kin K.: *See*—
Evans, Steven; and Lum, Kin K., 4,695,287, Cl. 8-471.000.
Vanier, Noel R.; and Lum, Kin K., 4,695,286, Cl. 8-471.000.

Lundstrom, Christer: *See*—
Lindholm, Carl-Henrik; and Lundstrom, Christer, 4,695,027, Cl. 248-325.000.

Lundy, Allen W.; and Kasle, Leonard, to Kasle Steel Corporation. Expanding arbor. 4,694,559, Cl. 29-559.000.

Lupoli, Peter J.; and Mattis, Donald J., to Casco Products Corporation. Engine exhaust particulate ignitor construction. 4,695,429, Cl. 422-49.000.

Lutron Electronics Co. Inc.: *See*—
D'Aleo, Michael J.; and Smaich, Mark, 4,695,820, Cl. 338-179.000.

Lyall, Lucian H., to R. W. Lyall & Company, Inc. Method for developing a predetermined fusing temperature in thermoplastic items. 4,695,335, Cl. 156-64.000.

Lynch, Gary J.; and Yang, Chen-Hsyong, to Monsanto Company. Recovery of phenol from aqueous solution. 4,695,410, Cl. 260-410.500.

M. O. Enterprises, Inc.: *See*—
Johnston, John G., 4,694,691, Cl. 73-146.800.

M. W. Kellogg Company, The: *See*—
Ezernack, Daniel D.; and Armstrong, Robert B., 4,695,367, Cl. 208-106.000.

Macander, Aleksander B.: *See*—
Crane, Roger M.; and Macander, Aleksander B., 4,695,344, Cl. 156-242.000.

Maccioni, Roberto: *See*—
Flosi, Corrado; Gobbi, Alberto; Maccioni, Roberto; and Simonetta, Guerrieri, 4,694,505, Cl. 2-2.000.

MacDonald, John B.; and McLinn, David E., to Continental Molding Corporation. Diskette holder. 4,695,103, Cl. 312-18.000.

Macdonald, Peter, to Sicor Societa Italiana Corticosteroidi S.p.A. Process for the preparation of 16,17 acetals of pregnane derivatives. 4,695,625, Cl. 540-63.000.

MacDonald, R. I.; Lam, D. K. W.; and Jenkins, R. W., to Canadian Patents and Development Limited-Societe Canadienne des Brevets et D'Exploitation Limitee. Reflex optoelectronic switching matrix. 4,696,059, Cl. 455-600.000.

Machida, Toyotaka: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Machuron, Jean-Yves: *See*—
Frizot, Alain; Cadaureille, Gerard; Lalere, Jean-Christophe; and Machuron, Jean-Yves, 4,694,585, Cl. 33-502.000.

Macier, James E.: *See*—
Broughton, George L.; and Macier, James E., 4,695,261, Cl. 440-900.000.

MacKay, Joseph H., Jr. Disposable depressed center grinding wheel having an integral mounting hub. 4,694,615, Cl. 51-168.000.

Mackenroth, Kerry. Digital pacing indicator for motorcycles. 4,695,958, Cl. 364-424.000.

Macleod, Robert B., Jr., to Shape Inc. Tape cassette assembly tray. 4,694,950, Cl. 198-465.300.

Macrovision: *See*—
Ryan, John O., 4,695,901, Cl. 380-5.000.

Maddux, Forrest E., Jr.; Eagle, Paul A.; and Robbins, Robert L., to Ultra Bagger Co. of Cincinnati, The. Apparatus and method of loading articles into an inflated bag from a web. 4,694,638, Cl. 53-459.000.

Maeda, Kumiko: *See*—
Ueno, Hideo; Hattori, Hiroshi; Maeda, Kumiko; and Yamada, Keiko, 4,695,172, Cl. 400-83.000.

Maeda, Takanori: *See*—
Kotaka, Fumitaka; and Maeda, Takanori, 4,695,158, Cl. 356-123.000.

Maegawa, Yuzo: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.

Maerfeld, Charles, to CGR Ultrasonic. Ultrasonic sensor for electronic sectorial scanning and echograph incorporating such a sensor. 4,694,700, Cl. 75-628.000.

Maerte, Leo: *See*—
Graf, Lothar; Maerte, Leo; and Skorka, Thomas, 4,694,977, Cl. 222-259.000.

Magami, Masato; Saeki, Kazumi; Miura, Takanori; and Inoue, Takeshi, to Yoshitomi Pharmaceutical Industries, Ltd. Phthalate compounds. 4,695,649, Cl. 560-86.000.

Magauran, Edward D.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.

Magdesyan, Garnik; Magdesyan, Stepan; and Boodanian, Leon P. Battery terminal post clamp. 4,695,118, Cl. 439-726.000.

Magdesyan, Stepan: *See*—
Magdesyan, Garnik; Magdesyan, Stepan; and Boodanian, Leon P., 4,695,118, Cl. 439-726.000.

Magnusson, Dan A.: *See*—
Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., 4,695,272, Cl. 604-84.000.

Mahalek, Josef; and Vetter, Egon, to Telefunken electronic GmbH. Short circuit and overload protection circuit for output stage transistors. 4,695,915, Cl. 361-56.000.

Mahapatra, Amaresh; McMahon, Donald H.; Robinson, William C.; and Sanford, Norman A., to Polaroid Corporation. Integrated optic resonant structres and fabrication method. 4,695,121, Cl. 350-96.120.

Maier, Helmut K.: *See*—
Tuominen, Francis W.; Maier, Helmut K.; and Howland, Warren W., 4,695,453, Cl. 424-81.000.

Mairot, Guy, to S.c.a.i.m.e. Instrument for measuring and recording forces. 4,694,922, Cl. 177-178.000.

Mais, Dale: *See*—
Eller, Thomas D.; Halushka, Perry V.; Knapp, Daniel R.; and Mais, Dale, 4,695,647, Cl. 560-53.000.

Maistrovich, Anthony R.: *See*—
Engler, David A.; and Maistrovich, Anthony R., 4,695,608, Cl. 525-308.000.

Makino, Hiroshi; Yoshino, Tsunemi; Kihara, Tadaharu; and Takashima, Akira, to West Electric Company, Ltd. Automatic focusing apparatus. 4,695,893, Cl. 358-227.000.

Makino, Osamu: *See*—
Watanabe, Hirotoshi; Makino, Osamu; and Ishida, Toru, 4,695,504, Cl. 428-209.000.

Malashenko, Leon: *See*—
Hepburn, James; and Malashenko, Leon, 4,694,744, Cl. 100-214.000.

Malburg, Werner: *See*—
Seidel, Albert; and Malburg, Werner, 4,694,655, Cl. 62-51.000.

Mallary, Michael L., to Digital Equipment Corporation. Method for producing magnetic heads. 4,695,351, Cl. 204-15.000.

Mallinckrodt, Inc.: *See*—
Wijayarthna, Bandula; and Newman, Glenn E., 4,694,838, Cl. 128-658.000.

Mallon, Joseph R.: *See*—
Kurtz, Anthony D.; and Mallon, Joseph R., 4,695,817, Cl. 338-4.000.

Malm, Robert E., to Northrop Corporation. Infrared imaging array employing metal tabs as connecting means. 4,695,715, Cl. 250-211.000.

Mamont, Pierre: *See*—
Gerhart, Fritz; and Mamont, Pierre, 4,695,654, Cl. 564-510.000.

Mannesmann Aktiengesellschaft: *See*—
Gugel, Bernd; Niebel, Harald; and Ott, Hubert, 4,695,174, Cl. 400-124.000.

Mannesmann Kienzle GmbH: *See*—
Gorner, Horst; Furstwangler, Walter; and Usbeck, Walter, 4,695,048, Cl. 271-122.000.

Mannesmann Rexroth GmbH: *See*—
Rott, Horst, 4,694,862, Cl. 137-625.500.

Mans, Rusty J., to University of Florida. ATP: polynucleotide adenylyltransferase enzyme and method of preparation thereof. 4,695,550, Cl. 435-194.000.

Marathon Oil Company: *See*—
Sengul, M. Marc; and Hinchman, Steven B., 4,694,904, Cl. 166-252.000.

Marbetech Corporation: *See*—
Dick, Franklin A., 4,694,685, Cl. 73-104.000.

Marburg, Stephen; Tolman, Richard L.; and Kniskern, Peter J., to Merck & Co., Inc. Covalently-modified polyanionic bacterial polysaccharides, stable covalent conjugates of such polysaccharides and immunogenic proteins with bigeneric spacers, and methods of preparing such polysaccharides and conjugates and of confirming covalency. 4,695,624, Cl. 530-395.000.

Marchetti, Augusto. Machine for sealing cardboard boxes of constant width. 4,694,635, Cl. 53-137.000.

Marchini, Timothy R.: *See*—
Brandt, Henry R.; Gannon, Patrick M.; Leung, Wan L.; and Marchini, Timothy R., 4,695,950, Cl. 364-200.000.

Marchio, Fabio: *See*—
Menniti, Pietro; and Marchio, Fabio, 4,695,786, Cl. 323-303.000.

Marchitto, Michael J.; and Bocciarelli, Louis R., to United Technologies Corporation. Helicopter rotor backup damper system. 4,695,226, Cl. 416-106.000.

Marinho, John: *See*—
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.

Mariol, James F., to Fairdale Orthodontic Company. Breakaway orthodontic face bow appliance. 4,695,250, Cl. 433-5.000.

Marks, George R. Reversible mortise lock. 4,695,082, Cl. 292-169.160.

Marot, Lajos K. D.: *See*—
Leth-Olson, Henrik; and Marot, Lajos K. D., 4,695,691, Cl. 200-303.000.

Marozzi, Alfred A. Print head operating mechanism. 4,694,747, Cl. 101-301.000.

Marsh, Norman F.: *See*—
Fleckenstein, Phillip P.; and Marsh, Norman F., 4,695,685, Cl. 200-61.210.

Marshall, Christopher B., to U.S. Philips Corporation. RF tuning circuit which provides image frequency rejection. 4,696,055, Cl. 455-118.000.

Marshall, Neil A., to Hughes Aircraft Company. Open fault location system for photovoltaic module strings. 4,695,788, Cl. 324-527.000.

Martin, Ronald G.: *See*—
Trocciola, John C.; Powers, Joseph; and Martin, Ronald G., 4,695,518, Cl. 429-12.000.

Martinola, Friedrich: *See*—
Oeckl, Siegfried; Mitschker, Alfred; Lange, Peter M.; and Martinola, Friedrich, 4,695,556, Cl. 502-11.000.

Maruyama, Hiromi: *See*—
Aoyama, Motoo; Maruyama, Hiromi; Umegaki, Kikuo; and Uchikawa, Sadao, 4,695,425, Cl. 376-435.000.

Maruyama, Hiroshi; Mizushima, Kunio; Sakemoto, Akito; and Umebayashi, Nobuhiro, to Hitachi Maxell, Ltd. Recording disc cartridge having an improved hub assembly. 4,695,910, Cl. 360-133.000.

Mary, Donald J., to United States of America, Army. Method for determining the angular dimensions of a scene recorded by a video system. 4,695,892, Cl. 358-225.000.

Masaki, Shinzaburo: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.

Maschinenfabrik Rieter AG: *See*—
Fretz, Walter; and Hefti, Walter, 4,695,000, Cl. 242-18.0DD.

Masheff, Michael S.; and Sanders, David E., to E-Systems, Inc. Quadrature signal generator having digitally-controlled phase and amplitude correction. 4,696,017, Cl. 375-60.000.

Massingill, Larry W.; and Perkins, Derrick O., to OnLine Computer Systems Inc. Apparatus for generating signals synchronized to an unstable external signal. 4,695,805, Cl. 328-72.000.

Maston, Donald M.; and Mertz, Kenneth H., to Chrysler Motors Corporation. Printed circuit board, edgeboard connector therefor. 4,695,112, Cl. 439-350.000.

Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., to Canadian Marconi Corporation. Antenna alignment system and method. 4,696,053, Cl. 455-67.000.

Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, to Nisshin Steel Co., Ltd. Heat resistant precoated steel sheet and process for the production thereof. 4,695,516, Cl. 428-623.000.

Masui, Toshiyuki: *See*—
Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, 4,696,008, Cl. 371-47.000.

Masumoto, Mituhiko; Yanada, Shigeo; and Kinugawa, Tadami, to Mitsubishi Gas Chemical Company, Inc. Copolycarbonate resin from branched chain alkylene bis phenol. 4,695,620, Cl. 528-204.000.

Mathews, Will W., to Cummins Engine Company, Inc. Method of remanufacturing a rock drill bit. 4,694,551, Cl. 29-402.080.

Mathis, Joseph R.: *See*—
Blevins, Ballard J.; Kulpa, William G.; Mathis, Joseph R.; and McCullough, John W., 4,695,948, Cl. 364-200.000.

Mathis, Ronald F., to General Dynamics Electronics Division. RF frequency spectrum analyzer subsystem. 4,695,790, Cl. 324-77.00K.

Matolcsy, Gyorgy: *See*—
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

Matsubara, Yasuko: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Matsuda, Hideo: *See*—
Tsunoda, Yoshiaki; and Matsuda, Hideo, 4,695,871, Cl. 357-74.000.

Matsuda, Hiroshi: *See*—
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, 4,695,717, Cl. 250-213.00R.

Matsui, Kunio; Fukase, Hisahiko; and Nomura, Akihiro, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Dual roll type continuous casting machine. 4,694,887, Cl. 164-428.000.

Matsui, Susumu: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.

Matsuki, Yuji: *See*—
Ichikawa, Wataru; Matsuki, Yuji; Hirata, Yoshiaki; and Ito, Mikiya, 4,695,235, Cl. 425-29.000.

Matsumoto, Takemasa: *See*—
Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, 4,694,749, Cl. 101-426.000.

Matsumoto, Tokikazu, to Matsushita Electric Industrial Co., Ltd. Video signal processing apparatus for compensating for time differences between luminance and chrominance signals of a PAL system. 4,695,877, Cl. 358-36.000.

Matsumoto Yoshiaki; Yamagata, Shinji; and Sugihara, Kazuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Circuit breaker. 4,695,814, Cl. 337-77.000.

Matsumoto, Yukihiro: *See—*
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.

Matsunaga, Satoshi: *See—*
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Matsushige, Hiromi: *See—*
Momata, Kazuhiro; Dekura, Yoshinori; Honzawa, Tadashi; and Matsushige, Hiromi, 4,695,909, Cl. 360-122.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Honjo, Masahiro; and Hashima, Akio, 4,695,900, Cl. 358-310.000.
Inaji, Toshio; Okamoto, Hiroshi; and Yokobori, Nobuyoshi, 4,695,907, Cl. 360-107.000.
Matsumoto, Tokikazu, 4,695,877, Cl. 358-36.000.
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; and Ishida, Toru, 4,695,403, Cl. 252-513.000.
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Hiraka, Masahiro, 4,694,573, Cl. 29-846.000.
Tachita, Ryobun; and Teranishi, Akio, 4,696,058, Cl. 455-277.000.
Takagi, Yuuji; Satoh, Isao; and Sugimura, Tatsuo, 4,695,993, Cl. 369-54.000.
Watanabe, Hirotoshi; Makino, Osamu; and Ishida, Toru, 4,695,504, Cl. 428-209.000.

Matsushita Electric Works, Ltd.: *See—*
Komatsu, Teruaki; Kobayashi, Kiyoshi; Tatsu, Kunihiko; and Shibata, Shoichi, 4,695,065, Cl. 279-60.000.
Nobutoki, Kazuhiro; and Ono, Kenji, 4,695,813, Cl. 335-78.000.

Matsushita Electronics Corporation: *See—*
Ogasawara, Toshitaka; Nohmi, Kazumasa; Honmoh, Masao; and Iseki, Yukito, 4,695,763, Cl. 313-487.000.

Matsushita, Mitsuo, to Mita Industrial Co., Ltd. Doctor blade positioning in electrophotographic copying machines. 4,695,153, Cl. 355-3.0DD.

Matsushita, Soichi: *See—*
Kato, Kenji; Matsushita, Soichi; and Nakanishi, Kiyoshi, 4,694,794, Cl. 123-306.000.

Mattel, Inc.: *See—*
Crosby, Michael A.; and Foss, Art J., 4,695,262, Cl. 446-236.000.

Matthews, John C.: *See—*
Anderson, Paul T.; Irwin, Lawrence; Matthews, John C.; and Paugh, Charles E., 4,694,634, Cl. 53-88.000.

Mattis, Donald J.: *See—*
Lupoli, Peter J.; and Mattis, Donald J., 4,695,429, Cl. 422-49.000.

Matumura, Hiroyoshi: *See—*
Ishida, Koji; and Matumura, Hiroyoshi, 4,695,122, Cl. 350-96.120.

Matuska, David G., to United Technologies Corporation. Filament wound structure having filament wound reinforcing rings for use as a torque drive. 4,695,340, Cl. 156-161.000.

Matuska, David G.; and Fredenburgh, Evan A., to United Technologies Corporation. Filament wound structure for use as a torque drive. 4,695,341, Cl. 156-161.000.

Matz, James: *See—*
Cohen, Theodore; and Matz, James, 4,695,584, Cl. 514-456.000.

Maurer, Fritz; and Grohe, Klaus, to Bayer Aktiengesellschaft. Aminoacrylic acid derivatives. 4,695,646, Cl. 560-43.000.

Maurer, William C.: *See—*
McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., 4,694,913, Cl. 175-61.000.

Max, Arnold: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Maxwell Laboratories, Inc.: *See—*
Dunn, Joseph E.; and Pearlman, Jay S., 4,695,472, Cl. 426-237.000.

Mayer, Ulrich: *See—*
Schleupen, Richard; Mayer, Ulrich; Bauer, Bernhard; and Langner, Arnd M., 4,696,002, Cl. 371-12.000.

Mayor, Jean-Michel; Steffen, Jurg; and Wuthrich, Peter, to Larassay Holding AG. Method of, and apparatus for, generating a predetermined pattern using laser radiation. 4,695,698, Cl. 219-121.00L.

Mays, Alfred T., to Chicopee. Method of making water impervious materials. 4,695,334, Cl. 156-62.200.

Mazda Motor Corporation: *See—*
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.
Kikuchi, Toshiyuki; and Yamamoto, Koichi, 4,694,709, Cl. 74-866.000.
Yagii, Koji; Miyata, Jun; and Takasuga, Shunzo, 4,695,699, Cl. 219-121.0LD.

McCafferty, Stanley E. Platform assembly for slanted ladder. 4,695,023, Cl. 248-238.000.

McCarroll, John J.: *See—*
Hall, Antony H. P.; and McCarroll, John J., 4,695,663, Cl. 585-417.000.

McClelland, Sandra K.; Conrad, Neal D.; and Desai, Nitin V., to RCA Corporation. Seal for liquid crystal display. 4,695,490, Cl. 428-1.000.

McCullen, Carol A. Bingo game marking template. 4,695,057, Cl. 273-269.000.

McCullough, John W.: *See—*
Blevins, Ballard J.; Kulpa, William G.; Mathis, Joseph R.; and McCullough, John W., 4,695,948, Cl. 364-200.000.

McCumber, Roger D.: *See—*
Bonin, Wayne A.; McCumber, Roger D.; and Teder, Rein S., 4,694,687, Cl. 73-116.000.

McCurry, Lynn E.: *See—*
Nalewajek, David; Kim, Jung T.; and McCurry, Lynn E., 4,695,522, Cl. 429-206.000.

McDaniel, Steven G., to United States of America, Army. Fiber optic guided missile aimer. 4,694,728, Cl. 89-1.110.

McDarren, Robert S.: *See—*
Simmel, Thomas L.; Crossley, David W.; and Morehouse, Mark N., 4,695,267, Cl. 446-462.000.

McDermott International, Inc.: *See—*
Montgomery, George J., IV; and Aghili, Hafez K., 4,695,303, Cl. 62-24.000.

McDermott, Michael G., to Bell of Pennsylvania. Encapsulation and insulation of electronic circuit board structures. 4,695,926, Cl. 361-395.000.

McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., to Gas Research Institute. Guided earth boring tool. 4,694,913, Cl. 175-61.000.

McDonnell, Damien G.: *See—*
Balkwill, Peter H.; Bishop, David L.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

McEvoy, Alfred P.: *See—*
Pruden, Charles W.; McEvoy, Alfred P.; and McEvoy, Charles S., 4,694,612, Cl. 49-445.000.

McEvoy, Charles S.: *See—*
Pruden, Charles W.; McEvoy, Alfred P.; and McEvoy, Charles S., 4,694,612, Cl. 49-445.000.

McGarrigle, Richard G.: *See—*
Sachs, Frederick; Auerbach, Anthony; McGarrigle, Richard G.; and Neil, James E., 4,695,709, Cl. 219-494.000.

McGeorge, Gram J., to Robershaw Controls Company. Electrically operated appliance controls and methods of making the same. 4,695,711, Cl. 219-506.000.

McGimpsey, Samuel B., to Vaal Reefs Mining and Exploration Co., Ltd. Cage deck. 4,695,219, Cl. 414-787.000.

McGinnis, Henry J. Tower and method of constructing a tower. 4,694,630, Cl. 52-649.000.

McGrath, John E. Method of clamping off a tubular member such as the neck of a balloon. 4,694,554, Cl. 29-450.000.

McKeown, James H. A., to British Telecommunications Public Limited Company. Correlator having spurious signal cancellation circuitry. 4,695,972, Cl. 364-819.000.

McKesson Corporation: *See—*
Hagan, Richard J., 4,694,975, Cl. 222-1.000.

McKinney, Donald L., to Boeing Company, The. Vacuum assembly for wire unwrapper. 4,694,998, Cl. 242-1.000.

McLeod, Marvin K., Jr. Convertible stuffed figure. 4,695,264, Cl. 446-321.000.

McLinn, David E.: *See—*
MacDonald, John B.; and McLinn, David E., 4,695,103, Cl. 312-18.000.

McMahon, Donald H.: *See—*
Mahapatra, Amaresh; McMahon, Donald H.; Robinson, William C.; and Sanford, Norman A., 4,695,121, Cl. 350-96.120.

McMurtry, Carl H.: *See—*
Korzekwa, Tadeusz M.; McMurtry, Carl H.; and Boecker, Wolfgang D. G., 4,695,294, Cl. 51-307.000.

Mechanical Technology Incorporated: *See—*
Vincent, Ronald J., 4,694,650, Cl. 60-520.000.

Medina, Antonio; and Zeevi, Yehoshua Y. Camera flash attachment for three dimensional imaging systems. 4,695,130, Cl. 350-132.000.

Medley, Frank W., III. Fluid filter having separable elements. 4,695,377, Cl. 210-132.000.

Medley, Travis D., Jr. Holder for eye glasses. 4,695,026, Cl. 248-316.500.

Medtronic, Inc.: *See—*
Meyerhoff, Mark E.; Fogt, Eric J.; and Untereker, Darrel F., 4,694,834, Cl. 128-635.000.
Rao, T. V.; and Samec, Robert C., 4,695,519, Cl. 429-52.000.

Meek, Thomas T.; and Blake, Rodger D., to United States of America, Energy. Mixture for producing fracture-resistant, fiber-reinforced ceramic material by microwave heating. 4,695,695, Cl. 219-10.55M.

Mehta, Bakulesh A.: *See—*
Morganstein, Sanford J.; Tuck, Edward F.; Mehta, Bakulesh A.; and Krakau, Herbert B., 4,696,028, Cl. 379-88.000.

Meier, Konrad: *See—*
Jahnke, Andreas; Ries, Gunter; and Meier, Konrad, 4,694,868, Cl. 140-92.100.

Meijer, Johan B. A., to Rodiac Intercessor Ltd. Scraper cleaning apparatus for reversible conveyor belts. 4,694,952, Cl. 198-499.000.

Meinel, Holger: *See—*
Jehle, Franz; and Meinel, Holger, 4,695,842, Cl. 342-59.000.

Meisner, Edward O.; and Romine, Charles F., to Eagle-Picher Industries, Inc. Valve stem seal. 4,695,061, Cl. 277-27.000.

Meister, Pierre-Andre ; Schmidli, Pierre; and Soltermann, Bertrand, to ETA SA Fabriques D'Ebauches. Electronic watch having two motors and comprising means for perpetually indicating the day of the month. 4,695,168, Cl. 368-31.000.

Melvin, Lawrence S., to Pfizer Inc. Tricyclic oxindole antiinflammatory agents. 4,695,571, Cl. 514-275.000.

Menaker, Mark: *See—*
Nineberg, Edward; and Menaker, Mark, 4,694,947, Cl. 193-34.000.
Mendonsa, Alvin A.; and Eshoff, Donald D. Clarinet stand. 4,695,022, Cl. 248-176.000.
Menendez, Rita J. Food carrier assembly. 4,694,961, Cl. 206-508.000.
Menniti, Pietro; and Marchio, Fabio, to SGS Microelettronica SpA. Voltage regulator for an alternator having an auxiliary stage for starting the alternator at a low rotational speed. 4,695,786, Cl. 323-303.000.
Merchant, David E., to Emhart Industries Inc. Valve supervisory switch. 4,695,686, Cl. 200-61.860.
Merchant, John: *See—*
Lees, David E. B.; and Merchant, John, 4,695,959, Cl. 364-458.000.
Merck & Co., Inc.: *See—*
Hannah, John; and Christensen, Burton G., 4,695,565, Cl. 514-206.000.
Kollonitsch, Janos; and Patchett, Arthur A., 4,695,588, Cl. 514-538.000.
Marburg, Stephen; Tolman, Richard L.; and Kniskern, Peter J., 4,695,624, Cl. 530-395.000.
Monaghan, Richard L.; Goetz, Michael A.; and Chang, Raymond S., 4,695,544, Cl. 435-119.000.
Merger, Franz; and Towae, Friedrich, to BASF Aktiengesellschaft. Process for the preparation of N,o-substituted mono-and/or polyurethanes. 4,695,645, Cl. 560-24.000.
Merlin Gerin: *See—*
Terracol, Claude; and Roulet-Dubonnet, Jean-Pierre, 4,695,913, Cl. 361-13.000.
Merrell Dow Pharmaceuticals Inc.: *See—*
Gerhart, Fritz; and Mamont, Pierre, 4,695,654, Cl. 564-510.000.
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, to Boehringer Mannheim GmbH. Pyrrolobenzimidazoles, pharmaceutical compositions containing them and method of using them to treat certain heart and circulatory diseases. 4,695,567, Cl. 514-253.000.
Mertz, Kenneth H.: *See—*
Maston, Donald M.; and Mertz, Kenneth H., 4,695,112, Cl. 439-350.000.
Mesnard, Robert M.: *See—*
Kerr, Randal H.; and Mesnard, Robert M., 4,696,003, Cl. 371-19.000.
Messerschmitt-Bolkow-Blohm GmbH: *See—*
Seidel, Albert; and Malburg, Werner, 4,694,655, Cl. 62-51.000.
Metcal, Inc.: *See—*
Busch, Paul F., 4,695,712, Cl. 219-535.000.
Krumme, John F., 4,695,713, Cl. 219-553.000.
Metme Communications: *See—*
Bloy, Graham P.; and Miramonti, John L., 4,695,825, Cl. 340-347.0SH.
Meyer, Victor E.: *See—*
Dorman, Linneaus C.; Meyer, Victor E.; and Wu, Marinda L., 4,695,295, Cl. 55-16.000.
Meyerhoff, Mark E.; Fogt, Eric J.; and Untereker, Darrel F., to Medtronic, Inc. Gas sensor. 4,694,834, Cl. 128-635.000.
Michel, Hartmut: *See—*
Flohrs, Peter; and Michel, Hartmut, 4,695,867, Cl. 357-46.000.
Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, 4,694,814, Cl. 123-644.000.
Microdot Inc.: *See—*
Berecz, Imre, 4,695,212, Cl. 411-85.000.
Microgon, Inc.: *See—*
Cronin, James J., 4,695,382, Cl. 210-436.000.
Mielke, Siegfried, to Kolbenschmidt AG. Piston for internal combustion engines. 4,694,813, Cl. 123-668.000.
Mieth, Guenther; and Schwarz, Ulf, to Siemens Aktiengesellschaft. Circuit arrangement for feeding an electrical load from a solar generator. 4,695,785, Cl. 323-222.000.
Mikami, Naoko: *See—*
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, 4,695,651, Cl. 560-141.000.
Mikami, Takashi: *See—*
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.
Mikhailovsky, Leonid; and Ramotar, Jay G., to Bridginfill Design Ltd. Concrete arch buried bridge. 4,695,187, Cl. 405-124.000.
Miki, Takahiro: *See—*
Ando, Hideki; and Miki, Takahiro, 4,695,826, Cl. 340-347.0DA.
Miki, Yutaka: *See—*
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.
Milano, Pamela D.: *See—*
Heather, James B.; and Milano, Pamela D., 4,695,673, Cl. 568-310.000.
Miles, James E., to Isotechnologies, Inc. Valve system for exercise apparatus. 4,695,100, Cl. 303-10.000.
Miller, J. Wayne; and Ward, John W., to Union Oil Company of California. Desulfurization process. 4,695,366, Cl. 208-91.000.
Miller, John C., Jr. Holder for side-handle baton with allen wrench. 4,694,981, Cl. 224-251.000.
Miller, Kevin P.: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., 4,695,473, Cl. 426-535.000.
Miller, Randolph F.: *See—*
Smith, David B.; and Miller, Randolph F., 4,695,050, Cl. 272-72.000.
Miller, Robert V., to Hewlett-Packard Company. Auto ranging of a frequency measuring instrument. 4,695,791, Cl. 324-78.00D.
Miller, Roy W., to Pullman Rail Leasing Inc. Pneumatic gate operator and outlet cap. 4,695,207, Cl. 406-130.000.
Miller, Russell S., to General Electric Company. Low cost intermediate radiation shield for a magnet cryostat. 4,694,663, Cl. 62-514.00R.
Millham, Ernest H.; Moser, John J.; Shushereba, John J.; and Visco, Gary P., to International Business Machines Corporation. Apparatus for reducing test data storage requirements for high speed VLSI circuit testing. 4,696,005, Cl. 371-27.000.
Mills, Floyd J. Reduced volume digital inclinometer. 4,694,584, Cl. 33-366.000.
Mimoto, Toshio; and Sakiyama, Keizo, to Sharp Kabushiki Kaisha. Monolithic semiconductor integrated circuit with programmable elements for minimizing deviation of threshold value. 4,695,745, Cl. 307-297.000.
Minelco, Inc.: *See—*
Hart, Robert D.; and Ambrozaitis, John J., 4,694,599, Cl. 40-449.000.
Minigrip, Inc.: *See—*
Ausnit, Steven; and Bentsen, Per, 4,694,959, Cl. 206-390.000.
Minnesota Mining and Manufacturing: *See—*
Pool, Daniel L., 4,695,006, Cl. 242-56.300.
Minnesota Mining and Manufacturing Company: *See—*
Delfino, Gerolamo; Franco, Simone; and Verdi, Cesare, 4,695,531, Cl. 430-513.000.
Engler, David A.; and Maistrovich, Anthony R., 4,695,608, Cl. 525-308.000.
Moris, Alfred H., 4,695,003, Cl. 242-55.19A.
Randklev, Ronald M., 4,695,251, Cl. 433-8.000.
Strand, Jerome E., 4,694,835, Cl. 128-640.000.
Minolta Camera Kabushiki Kaisha: *See—*
Hamaguri, Kenji, 4,694,833, Cl. 128-633.000.
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.
Minor, James C., to Eastman Kodak Company. Corona-charging apparatus. 4,695,723, Cl. 250-325.000.
Miramonti, John L.: *See—*
Bloy, Graham P.; and Miramonti, John L., 4,695,825, Cl. 340-347.0SH.
Mistry, Keku M.: *See—*
Steigerwald, Robert L.; and Mistry, Keku M., 4,695,934, Cl. 363-17.000.
Misumi, Shikao: *See—*
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.
Mita Industrial Co., Ltd.: *See—*
Matsushita, Mitsuo, 4,695,153, Cl. 355-3.0DD.
Mitani, Kazutami: *See—*
Itoh, Hajime; and Mitani, Kazutami, 4,695,592, Cl. 521-54.000.
Mitani, Tatsuro: *See—*
Inoue, Kazuhiko; Mitani, Tatsuro; and Kishita, Yoshihiro, 4,695,869, Cl. 357-71.000.
Mitchell, Arthur W. Gas or vapor dispersing apparatus. 4,694,604, Cl. 43-114.000.
Mitera, Richard T.: *See—*
Heideman, Robert J.; and Mitera, Richard T., 4,694,939, Cl. 188-287.000.
Mitschker, Alfred: *See—*
Oeckl, Siegfried; Mitschker, Alfred; Lange, Peter M.; and Martinola, Friedrich, 4,695,556, Cl. 502-11.000.
Mitsubishi Chemical Industries Limited: *See—*
Ninomiya, Kunihiro; Nitta, Isei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, 4,695,568, Cl. 514-258.000.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Ando, Hideki; and Miki, Takahiro, 4,695,826, Cl. 340-347.0DA.
Arinobu, Ichirou, 4,695,961, Cl. 364-483.000.
Higashino, Shigenori, 4,695,932, Cl. 363-14.000.
Kodai, Syojiro; Fujii, Noriaki; Gamo, Hiroshi; and Kobayashi, Bujirou, 4,695,925, Cl. 361-395.000.
Kumamoto, Toshio, 4,695,748, Cl. 307-355.000.
Matsumoto Yoshiaki; Yamagata, Shinji; and Sugihara, Kazuyoshi, 4,695,814, Cl. 337-77.000.
Ozaki, Yoshio; Tsurumoto, Kazuo; Yatomi, Takeshi; and Yamamoto, Masahiro, 4,695,696, Cl. 219-69.00P.
Tada, Hideaki, 4,695,938, Cl. 363-37.000.
Takeda, Masatoshi, 4,695,741, Cl. 307-643.000.
Tobita, Youichi, 4,695,746, Cl. 307-297.000.
Wataya, Seiji; Shimomura, Setsuhiro; and Nishimura, Yukinobu, 4,694,806, Cl. 123-494.000.
Yamamoto, Yuuichi, 4,695,675, Cl. 174-15.0CA.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Masumoto, Mituhiko; Yanada, Shigeo; and Kinugawa, Tadami, 4,695,620, Cl. 528-204.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See—*
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Kokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.
Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, 4,694,749, Cl. 101-426.000.

Mitsubishi Rayon Co., Ltd.: *See*—
Itoh, Hajime; and Mitani, Kazutami, 4,695,592, Cl. 521-54.000.
Setsuie, Takashi; Otani, Takeji; and Yoshida, Kanji, 4,695,415, Cl. 264-29.200.

Mitsui Engineering & Shipbuilding Co., Ltd.: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.

Mitsui Sugar Co., Ltd.: *See*—
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.

Miura, Hirohisa; Satoh, Hiroshi; Natsume, Toshio; and Katagiri, Hidenori, to Toyota Jidosha Kabushiki Kaisha. Metal distillation method utilizing double vaporization. 4,695,319, Cl. 75-63.000.

Miura, Takanori: *See*—
Magami, Masato; Saeki, Kazumi; Miura, Takanori; and Inoue, Takeshi, 4,695,649, Cl. 560-86.000.

Miyahara, Junji: *See*—
Mori, Nobufumi; Hosoi, Yuichi; Takahashi, Kenji; and Miyahara, Junji, 4,695,725, Cl. 250-327.200.

Miyahara, Masato: *See*—
Himono, Yusaku; Moriya, Yoshiaki; Miyahara, Masato; and Suzuki, Kazuhiro, 4,695,124, Cl. 350-96.200.

Miyaji, Naotaka: *See*—
Iwahara, Makoto; Miyaji, Naotaka; and Sakamoto, Atsushi, 4,696,043, Cl. 381-92.000.

Miyajima, Takeshi, to Hitachi Construction Machinery Co., Ltd. Method of measuring factor of stress concentration by utilizing ultrasound. 4,694,698, Cl. 73-570.000.

Miyake, Johji: *See*—
Hayashi, Sousichi; Miyake, Johji; Koyama, Mototsugu; and Sakaguchi, Kanji, 4,695,329, Cl. 148-3.000.

Miyamoto, Masao: *See*—
Watanabe, Fumio; Komaki, Shojiro; Miyamoto, Masao; and Ito, Takao, 4,695,724, Cl. 250-292.000.

Miyamoto, Yasuhiko, to Fuji Jukogyo Kabushiki Kaisha. Fuel cock for an internal combustion engine. 4,694,810, Cl. 123-516.000.

Miyao, Masanobu: *See*—
Warabisako, Terunori; Ohkura, Makoto; and Miyao, Masanobu, 4,695,856, Cl. 357-4.000.

Miyaoka, Takashi: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Masegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.

Miyasaka, Katsuhiko: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Miyashita, Kunio: *See*—
Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syooichi, 4,694,688, Cl. 73-116.000.

Miyashita, Yoshibonu: *See*—
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.

Miyata, Jun: *See*—
Yagi, Koji; Miyata, Jun; and Takasuga, Shunzo, 4,695,699, Cl. 219-121.0LD.

Miyata, Teruo; and Noishiki, Yasuharu, to Koken Co., Ltd. Medical material. 4,695,281, Cl. 623-11.000.

Miyazawa, Katsuhiko: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, to Kabushiki Kaisha Kobe Seiko Sho. Screw rotor mechanism. 4,695,233, Cl. 418-83.000.

Mizumoto, Yukihiro: *See*—
Ishii, Hiroshi; Nakai, Syunzi; and Mizumoto, Yukihiro, 4,695,847, Cl. 346-1.100.

Mizuno, Akira; and Clements, Judson S., to Florida State University. Method of removing SO_2, NO_x and particles from gas mixtures using streamer corona. 4,695,358, Cl. 204-174.000.

Mizushima, Kunio: *See*—
Maruyama, Hiroshi; Mizushima, Kunio; Sakemoto, Akito; and Umebayashi, Nobuhiro, 4,695,910, Cl. 360-133.000.

Mizushina, Youichi, to Denkoh Co. Ltd. Vertical furnace for heat-treating semiconductor. 4,695,706, Cl. 219-390.000.

Mizutani, Takashi: *See*—
Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, 4,695,857, Cl. 357-16.000.

ML Corporation: *See*—
Nineberg, Edward; and Menaker, Mark, 4,694,947, Cl. 193-34.000.

MLR Electronic: *See*—
Lamiraux, Christian, 4,695,843, Cl. 342-417.000.

Mobil Oil Corporation: *See*—
Darilek, Glenn T., 4,695,840, Cl. 340-825.054.
Derouane, E. G.; Dessau, R. M.; Heilweil, I. J.; and Kerr, G. T., 4,695,642, Cl. 556-14.000.
Graziani, Kenneth R.; Kyan, Chwan P.; Shih, Stuart S.; and Sowiak, Raymond M., 4,695,364, Cl. 208-59.000.
Jones, Lloyd G.; and Stowe, Lawrence R., 4,694,727, Cl. 86-20.150.
Liu, Leland L.; and Touhsaent, Robert E., 4,695,503, Cl. 428-207.000.

Mochida, Takashi: *See*—
Nakamizo, Hiromitsu; and Mochida, Takashi, 4,695,795, Cl. 324-208.000.

Mochizuki, Toshio: *See*—
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, 4,694,748, Cl. 101-401.100.

Mogi, Eiji: *See*—
Kanai, Hideo; Komba, Toshinori; and Mogi, Eiji, 4,694,571, Cl. 29-806.000.

Mohr, Viggo: *See*—
Hellgren, Lars G. I.; Mohr, Viggo; and Vincent, Jan G., 4,695,457, Cl. 424-94.000.

Mohri, Masakazu: *See*—
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.

Molecular Diagnostics, Inc.: *See*—
Taylor, Peter W., 4,695,541, Cl. 435-18.000.

Moloney, Maurice M.: *See*—
Hilliard, Jeffrey L.; and Moloney, Maurice M., 4,695,547, Cl. 435-173.000.

Momata, Kazuhiro; Dekura, Yoshinori; Honzawa, Tadashi; and Matsushige, Hiromi, to Hitachi, Ltd. Magnetic head assembly. 4,695,909, Cl. 360-122.000.

Momiyama, Kikuo: *See*—
Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, 4,695,133, Cl. 350-427.000.

Momose, Yutaka: *See*—
Kobayashi, Daisaku; Itaba, Tunesaku; and Momose, Yutaka, 4,694,707, Cl. 74-606.00A.

Monaghan, Richard L.; Goetz, Michael A.; and Chang, Raymond S., to Merck & Co., Inc. Process for the preparation of cholecystokinin antagonists. 4,695,544, Cl. 435-119.000.

Monno, Asao; Watanabe, Kiyoo; and Kaneko, Kazuyuki, to Fuji Electric Co., Ltd.; and Fuji Facom Corporation and Kawasaki Steel Corporation. Tubular part wall thickness measuring device. 4,695,729, Cl. 250-358.100.

Monsanto Company: *See*—
Lynch, Gary J.; and Yang, Chen-Hsyong, 4,695,410, Cl. 260-410.500.

Montanari, Gerard M.; Baudelot, Francis E.; and Costes, Michel L., to International Business Machines Corporation. Device for performing wrap tests on a multiplex link in a data communication system. 4,695,997, Cl. 370-13.000.

Montaut, Jean P.: *See*—
Noguier, Jean P.; and Montaut, Jean P., 4,695,863, Cl. 357-38.000.

Montedison S.p.A.: *See*—
Albizzati, Enrico; Pettenati, Enrico; Zucchini, Umberto; and Cuffiani, Illaro, 4,695,558, Cl. 502-123.000.

Monteith, Robert C.; and Borgmann, Robert E., to Cincinnati Milacron Inc. Laser wrist. 4,695,701, Cl. 219-121.0LV.

Montgomery, George J., IV; and Aghili, Hafez K., to McDermott International, Inc. Method for recovery of natural gas liquids. 4,695,303, Cl. 62-24.000.

Moore Business Forms, Inc.: *See*—
Pretre, Roger, 4,695,077, Cl. 283-81.000.

Moorehead, Eric L.: *See*—
Ackelson, Donald B.; Moorehead, Eric L.; Ward, John W.; and Probst, Jon D., 4,695,365, Cl. 208-89.000.

Moosmann, Horst, to Gebruder Junghans GmbH. Explosive system for guided missiles and rocket projectiles. 4,694,751, Cl. 102-202.000.

Morehouse, Mark N.: *See*—
Simmel, Thomas L.; Crossley, David W.; and Morehouse, Mark N., 4,695,267, Cl. 446-462.000.

Morell, Joseph: *See*—
Petrini, Roland; and Morell, Joseph, 4,694,593, Cl. 36-120.000.

Morelli, Amedeo J.; and Gaylord, Francis L., to North American Philips Corporation. Method of manufacturing chip resistors with edge around terminations. 4,694,568, Cl. 29-620.000.

Morganstein, Sanford J.; Tuck, Edward F.; Mehta, Bakulesh A.; and Krakau, Herbert B., to Dytel Corporation. PBX Intercept and caller interactive attendant bypass system. 4,696,028, Cl. 379-88.000.

Mori, Katsuhiro: *See*—
Kito, Masahiro; and Mori, Katsuhiro, 4,694,894, Cl. 165-135.000.

Mori, Kenji: *See*—
Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, 4,695,247, Cl. 431-352.000.

Mori, Masashi; Nonaka, Shingo; and Nagai, Seiji, to Shinagawa Refractories Co., Ltd. Apparatus for mixing and pumping slurry. 4,695,167, Cl. 366-181.000.

Mori, Mitio: *See*—
Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, 4,695,466, Cl. 424-456.000.

Mori, Nobufumi; Hosoi, Yuichi; Takahashi, Kenji; and Miyahara, Junji, to Fuji Photo Film Co., Ltd. Method of detecting a focus defect of an electron microscope image. 4,695,725, Cl. 250-327.200.

Mori, Yasushi, to Nissan Motor Company, Limited. System and method for controlling fuel supply to a vehicular internal combustion engine with fuel supply cutoff function. 4,694,796, Cl. 123-325.000.

Mori, Yasushi, to Nissan Motor Company, Limited. Fuel injection control system for internal combustion engine with asynchronous fuel injection for fuel supply resumption following temporary fuel cut-off. 4,694,807, Cl. 123-501.000.

Mori, Yoshiaki: *See*—
Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaki, 4,695,317, Cl. 75-24.000.

Mori, Yuichi: *See*—
Watanabe, Koji; Okamoto, Miyoshi; Mori, Yuichi; and Noishiki, Yasuharu, 4,695,280, Cl. 623-1.000.

Morimoto, Nobuyuki; Takatsu, Kozo; and Sugimoto, Michio, to Research Association for Petroleum Alternatives Development. Crystalline aluminosilicate ISI-6. 4,695,440, Cl. 423-328.000.

Moris, Alfred H., to Minnesota Mining and Manufacturing Company. Self adjusting endless loop tape cartridge. 4,695,003, Cl. 242-55.19A.

Morishita Jintan Co., Ltd.: *See*—
Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, 4,695,466, Cl. 424-456.000.

Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, to Morishita Jintan Co., Ltd.; and Fujisawa Pharmaceutical Co., Ltd. Multiple soft capsules and production thereof. 4,695,466, Cl. 424-456.000.

Morita, Hiroyuki, to Kabushiki Kaisha Toshiba. Frequency converting circuit. 4,696,056, Cl. 455-182.000.

Morita, Tatsuo, to Nissan Motor Company, Limited. System and method for controlling ignition timing for an internal combustion engine. 4,694,800, Cl. 123-425.000.

Moriwaki, Masayoshi, to Fuji Photo Film Co., Ltd. Dustproof liner for a magnetic disc cartridge. 4,695,912, Cl. 360-133.000.

Moriya, Yoshiaki: *See*—
Himono, Yusaku; Moriya, Yoshiaki; Miyahara, Masato; and Suzuki, Kazuhiro, 4,695,124, Cl. 350-96.200.

Moriyama, Masatoshi; and Ohira, Masaki, to NEC Corporation. Method of making a bipolar transistor. 4,695,328, Cl. 437-31.000.

Moriyama, Yoshiaki, to Pioneer Electronic Corporation. Method of correcting errors in binary coded words. 4,696,007, Cl. 371-37.000.

Morris, Arthur J.; and Newton, Donald E., to Camco, Incorporated. Method and apparatus of injecting fluid into a well conduit by coil tubing. 4,694,908, Cl. 166-310.000.

Morsbach, Martin: *See*—
Brauers, Bert; and Morsbach, Martin, 4,695,064, Cl. 277-139.000.

Mort, Edgar A., to Inter-Lock Steel Company, Inc. Method of making a connector plate. 4,694,675, Cl. 72-325.000.

Morton, Alec J.: *See*—
Renner, Karl H.; and Morton, Alec J., 4,695,970, Cl. 364-724.000.

Morton Metalcraft Company: *See*—
Bridgwater, Jon, 4,694,818, Cl. 126-121.000.

Morton Thiokol, Inc.: *See*—
Amirsakis, Charles J., 4,695,604, Cl. 525-28.000.

Moser, John J.: *See*—
Millham, Ernest H.; Moser, John J.; Shushereba, John J.; and Visco, Gary P., 4,696,005, Cl. 371-27.000.

Mosheev, Robert R.: *See*—
Zhigalov, Gennady V.; Abduganiev, Abdurakhim; Kim, Sergei Y.; and Mosheev, Robert R., 4,694,642, Cl. 57-5.000.

Moss, Ira L. Compact disc dispensing and storage assembly. 4,694,954, Cl. 206-45.260.

Motooka, Wesley D., to Ford Aerospace & Communications Corporation. Optical scanner error compensator. 4,695,722, Cl. 250-235.000.

Motoren-und Turbinen-Union Munchen GmbH: *See*—
Wohrl, Bernhard, 4,694,895, Cl. 165-136.000.

Motorola, Inc.: *See*—
Bonta, Jeffrey D., 4,696,027, Cl. 379-60.000.
Breeden, Robert L., 4,696,051, Cl. 455-33.000.
Breeden, Robert L., 4,696,052, Cl. 455-51.000.
Schofield, William S., 4,695,886, Cl. 358-176.000.
Titus, John D., 4,694,752, Cl. 102-215.000.

Mottus, Edward H.; and Hedrick, Ross M., to DSM Rim Nylon V.O.F. Lactam polymerization initiators. 4,695,611, Cl. 525-432.000.

Mourani, George D., to Western Gear Corporation. Aircraft wing section movement apparatus. 4,695,014, Cl. 244-213.000.

Mowrer, Norman R., to Ameron, Inc. Solventless polyurethane spray compositions and method for applying them. 4,695,618, Cl. 528-55.000.

MTU Motoren- und Turbinen-Union Muenchen GmbH: *See*—
Pesch, Wilfried, 4,696,024, Cl. 378-73.000.

Mudzhiri, Yason N.: *See*—
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.

Mueller, Reiner: *See*—
Grosse, Joachim; Hess, Ruediger; Kuhl, Wilfried; and Mueller, Reiner, 4,695,687, Cl. 200-144.00B.

Muller-Beckmann, Bernd: *See*—
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.

Muller, Siegfried R.: *See*—
Dabisch, Wolfgang H.; Kung, Peter; Muller, Siegfried R.; and Narayanan, Krishnamoorthy, 4,695,528, Cl. 430-290.000.

Muraishi, Masakazu, to Nissan Motor Company, Limited. Seat for use in motor vehicle. 4,695,097, Cl. 297-452.000.

Murakami, Isato: *See*—
Kikumoto, Tadao; and Murakami, Isato, 4,694,724, Cl. 84-1.030.

Murakami, Yoshiteru: *See*—
Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, 4,695,514, Cl. 428-432.000.

Muraki, Tetsuzo: *See*—
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.

Muralidhara, Ranya: *See*—
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., 4,695,473, Cl. 426-535.000.

Murata Kikai Kabushiki Kaisha: *See*—
Nakagawa, Osamu, 4,694,949, Cl. 198-351.000.

Murata Manufacturing Co., Ltd.: *See*—
Tanaka, Yasuhiro, 4,695,756, Cl. 310-355.000.

Murata, Shuji: *See*—
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.

Murdoch, James B.: *See*—
Kramer, David M.; Compton, Russell A.; Strenk, Lawrence M.; and Murdoch, James B., 4,695,800, Cl. 324-309.000.

Murphy, Robert E.; Ballard, Gary R.; and Kuechenmeister, Rodney D., to Automation Service Equipment, Inc. Drive for double gripper chain conveyor. 4,694,953, Cl. 198-627.000.

Murphy, Roy E.: *See*—
Lau, Robert S.; Murphy, Roy E.; and Quick, Robert G., Jr., 4,695,772, Cl. 315-370.000.

Murray, Ledell L., to General Indicator Corporation. Indicia display module using light pipe. 4,694,600, Cl. 40-518.000.

Muschner, Udo: *See*—
Winkelmann, Manfred; Rothfuss, Hans; Muschner, Udo; and Schmitt, Karl H., 4,695,043, Cl. 266-265.000.

Musil, Edward C., to Flexible Steel Lacing Company. Safety strip for wire hook fasteners. 4,694,958, Cl. 206-340.000.

Musso, Giorgio, to Elettronica San Giorgio-Elsag S.p.A. Image scanning process and unit for detecting set forms. 4,696,049, Cl. 382-22.000.

Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, to Sanjo Machine Works, Ltd.; and Japan Tobacco, Inc. Apparatus for continuously supplying sheets from supply rolls. 4,695,007, Cl. 242-58.400.

Mycogen Corporation: *See*—
Barnes, Andrew C.; and Cummings, Susan G., 4,695,455, Cl. 424-93.000.
Barnes, Andrew C.; and Cummings, Susan G., 4,695,462, Cl. 424-195.100.

Nadolski, Klaus: *See*—
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.

Nagae, Kiyoshi, to Tokai TRW & Co., Ltd. Vehicular speed responsive power steering device. 4,694,927, Cl. 180-132.000.

Nagai, Kunio: *See*—
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.

Nagai, Masaaki, to Fuji Jukogyo Kabushiki Kaisha. System for controlling the ignition timing of an internal combustion engine. 4,694,801, Cl. 123-425.000.

Nagai, Seiji: *See*—
Mori, Masashi; Nonaka, Shingo; and Nagai, Seiji, 4,695,167, Cl. 366-181.000.

Nagano, Masahiko; and Sakaki, Naoaki, to Fuji Photo Film Co., Ltd. Recording and reproducing system employing balanced modulation for color video signal. 4,695,899, Cl. 358-310.000.

Nagase Medical Supply Co., Ltd.: *See*—
Kanai, Hideo; Komba, Toshinori; and Mogi, Eiji, 4,694,571, Cl. 29-806.000.

Nagashima, Nao, to Canon Kabushiki Kaisha. Image processing system. 4,695,895, Cl. 358-280.000.

Nagata, Shoji: *See*—
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.

Nagy, Monte L., Jr.; and Cole, Charles J., to Allied Corporation. Method of imparting stain resistance to colored substrates which include a filamentary material. 4,695,497, Cl. 428-96.000.

Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, to Ishida Scales Manufacturing Company, Ltd. Combination weighing system and method. 4,694,920, Cl. 177-25.000.

Nakagawa, Osamu, to Murata Kikai Kabushiki Kaisha. Article selecting system. 4,694,949, Cl. 198-351.000.

Nakagawa, Yukio: *See*—
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.

Nakagiri, Takashi: *See*—
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, 4,695,717, Cl. 250-213.00R.

Nakai, Seigo: *See*—
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Nakai, Syunzi: *See*—
Ishii, Hiroshi; Nakai, Syunzi; and Mizumoto, Yukihiro, 4,695,847, Cl. 346-1.100.
Nakajima, Junya: *See*—
Abe, Akira; Nakajima, Junya; and Nishikawa, Toshihiro, 4,695,529, Cl. 430-351.000.
Nakajima, Nobuyoshi: *See*—
Watanabe, Hideo; and Nakajima, Nobuyoshi, 4,695,726, Cl. 250-327.200.
Nakajima, Takayuki; Aoki, Tetsuo; Kobayashi, Katsumi; and Akiyama, Noboru, to Takeda Riken Kogyo Kabushikikaisha. Logic analyzer. 4,696,004, Cl. 371-25.000.
Nakajima, Yoshikazu: *See*—
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.
Nakakura, Yukinori; and Kato, Nobuyuki, to Sharp Kabushiki Kaisha. MOSFET semiconductor device and manufacturing method thereof. 4,695,479, Cl. 437-228.000.
Nakamizo, Hiromitsu; and Mochida, Takashi, to Sony Corporation. Rotation sensor with co-planar velocity and position responsive elements. 4,695,795, Cl. 324-208.000.
Nakamura, Kotaro; and Ishikawa, Takatoshi, to Fuji Photo Film Co., Ltd. Method for forming image using silver halide color photographic light-sensitive material. 4,695,530, Cl. 430-381.000.
Nakamura, Kozi: *See*—
Ikeda, Koichi; Nakamura, Kozi; and Okabe, Toshihiro, 4,695,947, Cl. 364-200.000.
Nakamura, Michinori: *See*—
Hara, Hiroyuki; Nakamura, Michinori; and Sugimoto, Yasuhiro, 4,695,750, Cl. 307-475.000.
Nakamura, Norio: *See*—
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, 4,694,748, Cl. 101-401.100.
Nakanishi, Kiyoshi: *See*—
Kato, Kenji; Matsushita, Soichi; and Nakanishi, Kiyoshi, 4,694,794, Cl. 123-306.000.
Nakanishi, Yasuhiro; and Kawai, Shoichi, to Sharp Kabushiki Kaisha. Combined electronic table preparation and graph drawing apparatus. 4,695,976, Cl. 364-900.000.
Nakano, Jiro; Ishibashi, Takao; Akatsuka, Takao; and Kawaguchi, Masao, to Toyota Jidosha Kabushiki Kaisha. Method and system for internal combustion engine oxygen sensor heating control with time smoothing. 4,694,809, Cl. 123-489.000.
Nakashima, Keishi: *See*—
Hatanai, Takashi; and Nakashima, Keishi, 4,695,512, Cl. 428-408.000.
Nakatani, Seiichi: *See*—
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; and Ishida, Toru, 4,695,403, Cl. 252-513.000.
Nakatsuka, Masashi: *See*—
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.
Nakatsukasa, Walter M., to Eli Lilly and Company. Culture and process for producing A41030 antibiotics. 4,695,545, Cl. 435-119.000.
Nakaya, Keiichi; and Tanaka, Kunio, to Asahi Glass Company Ltd. Magnesium hydroxide and process for its production. 4,695,445, Cl. 423-635.000.
Nakayama, Hiroki; Sato, Yasuhisa; and Yamada, Yasuyuki, to Canon Kabushiki Kaisha. Compact photographic lens. 4,695,134, Cl. 350-432.000.
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic light-sensitive material. 4,695,533, Cl. 430-558.000.
Nalewajek, David; Kim, Jung T.; and McCurry, Lynn E., to Allied Corporation. Aqueous battery with $(C_y F_x Cl_2)_n$ cathode. 4,695,522, Cl. 429-206.000.
Nanbu, Morio: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.
Narath, William R.: *See*—
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.
Narayanan, Krishnamoorthy: *See*—
Dabisch, Wolfgang H.; Kung, Peter; Muller, Siegfried R.; and Narayanan, Krishnamoorthy, 4,695,528, Cl. 430-290.000.
Narita, Ryuuho: *See*—
Yamashita, Kiyoshi; Aoshima, Terutaka; Narita, Ryuuho; and Imai, Masahiro, 4,695,710, Cl. 219-506.000.
Narumiya, Junichi: *See*—
Honma, Hiroshi; and Narumiya, Junichi, 4,695,734, Cl. 250-573.000.
Narusawa, Haruhiko: *See*—
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.
Nash, Sheryl A.: *See*—
Friedlander, Randal H.; Nash, Sheryl A.; and Komitor, Greg A., 4,695,493, Cl. 428-40.000.
Nasu, Seiji: *See*—
Ogura, Yukio; and Nasu, Seiji, 4,695,833, Cl. 340-722.000.
National Coupling Company, Inc.: *See*—
Smith, Robert E., III, 4,694,859, Cl. 137-614.040.
National Starch and Chemical Corporation: *See*—
Zwiercan, Gary A.; Lacourse, Norman L.; and Lenchin, Julianne M., 4,695,475, Cl. 426-582.000.
Natsume, Toshio: *See*—
Miura, Hirohisa; Satoh, Hiroshi; Natsume, Toshio; and Katagiri, Hidenori, 4,695,319, Cl. 75-63.000.
Navratil, Frank. Heat exchanger. 4,694,896, Cl. 165-142.000.
NCR Corporation: *See*—
Cabaniss, Frank W.; and Lockwood, James M., 4,695,808, Cl. 331-57.000.
Seevers, Daniel B.; and Rohulich, John J., 4,694,725, Cl. 84-1.270.
Nebelung, Hermann H., to Emhart Industries, Inc. Baffle moving mechanism for use in a glassware manufacturing machine of the individual section type. 4,695,307, Cl. 65-242.000.
NEC Corporation: *See*—
Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, 4,695,857, Cl. 357-16.000.
Fukuzo, Yukio; and Inoue, Yasukazu, 4,695,980, Cl. 365-222.000.
Kawai, Masato, 4,696,006, Cl. 371-27.000.
Koyabu, Kunihiro, 4,695,866, Cl. 357-42.000.
Moriyama, Masatoshi; and Ohira, Masaki, 4,695,328, Cl. 437-31.000.
Otani, Susumu, 4,696,057, Cl. 455-226.000.
Neefe, Charles W. Method of making a contact lens material which may be identified by colored fluorescence. 4,695,399, Cl. 252-301.350.
Nehring, Rudolf: *See*—
Otte, Werner; and Nehring, Rudolf, 4,695,660, Cl. 568-830.000.
Neil, Iain A., to Barr & Stroud Limited. Infrared optical system. 4,695,119, Cl. 350-1.200.
Neil, James E.: *See*—
Sachs, Frederick; Auerbach, Anthony; McGarrigle, Richard G.; and Neil, James E., 4,695,709, Cl. 219-494.000.
Nelson, Norvell J.: *See*—
Battey, James F.; Nelson, Norvell J.; and Barnett, Daniel J., 4,695,348, Cl. 156-647.000.
Nesheim, Ludwig D.: *See*—
Hanson, Daniel R.; and Nesheim, Ludwig D., 4,695.258, Cl. 439-67.000.
Nesmith, David V.: *See*—
Garcia, Armando; and Nesmith, David V., 4,694,605, Cl. 43-137.000.
Neste Oy: *See*—
Pulkkinen, Jorma, 4,695,188, Cl. 405-150.000.
Netzsch-Mohnopumpen GmbH: *See*—
Hantschk, Gunther, 4,695,040, Cl. 254-264.000.
Neves, Jason W.: *See*—
Lawrence, Alvah A.; and Neves, Jason W., 4,695,676, Cl. 174-22.00R.
New Mexico Tech Research Foundation: *See*—
Akashi, Tamotsu; and Sawaoka, Akira, 4,695,321, Cl. 75-243.000.
New, Richard, to Chevron Research Company. Flapper-type sealing system for a removable bottom founded structure. 4,695,192, Cl. 405-203.000.
New, Richard, to Chevron Research Company. Pad-type inflatable seal for a removable bottom founded structure. 4,695,196, Cl. 405-224.000.
New York Blood Center, Inc.: *See*—
Prince, Alfred M.; and Kim, Kwang S., 4,695,454, Cl. 424-89.000.
Newcomb, Nelson F.; and Newcomb, Nelson F., Jr. Illuminated translucent golf ball. 4,695,055, Cl. 273-213.000.
Newcomb, Nelson F., Jr.: *See*—
Newcomb, Nelson F.; and Newcomb, Nelson F., Jr., 4,695,055, Cl. 273-213.000.
Newman, Glenn E.: *See*—
Wijayarthna, Bandula; and Newman, Glenn E., 4,694,838, Cl. 128-658.000.
Newton, Donald E.: *See*—
Morris, Arthur J.; and Newton, Donald E., 4,694,908, Cl. 166-310.000.
Ney, Reuben E.; Pass, Raymond V.; and Yeager, Patrick F., to AMP Incorporated. Filtered electrical receptacle. 4,695,105, Cl. 439-95.000.
NGK Insulators, Ltd.: *See*—
Hattori, Isao; and Noiri, Hifuo, 4,695,242, Cl. 425-376.00R.
Kawasaki, Keiji, 4,694,689, Cl. 73-118.100.
NGK Spark Plug Co. Ltd.: *See*—
Banno, Hisao, 4,695,988, Cl. 367-154.000.
Okuno, Akiyasu; Watanabe, Masakazu; and Ikoma, Kazuhiko, 4,695,517, Cl. 428-698.000.
Nguyen, Vietson M.; Dhyanchand, P. John; and Thollot, Pierre, to Sundstrand Corporation. Multiphase DC-DC series-resonant converter. 4,695,933, Cl. 363-17.000.
Nicklas, Hans; and Pruzina, Christoph, to ISPO GmbH. Insulating board. 4,694,626, Cl. 52-309.120.
Nicolet Instrument Corporation: *See*—
Brierley, Philip R.; and Lowry, Stephen R., 4,695,727, Cl. 250-328.000.
Niebel, Harald: *See*—
Gugel, Bernd; Niebel, Harald; and Ott, Hubert, 4,695,174, Cl. 400-124.000.
Niethammer, Kurt: *See*—
Faust, Eberhard; Niethammer, Kurt; and Hammer, Ludwig, 4,695,095, Cl. 297-410.000.
Niikura, Masakazu: *See*—
Ouchi, Chiaki; Niikura, Masakazu; and Suenaga, Hiroyoshi, 4,694,985, Cl. 228-235.000.

Niles Parts Co., Ltd: *See*—
Takeoka, Seiei, 4,695,985, Cl. 367-87.000.
Nilson, Nils B.: *See*—
Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., 4,695,272, Cl. 604-84.000.
Nilsson, Ake S.: *See*—
Berglund, Bengt G.; Falk, Karl-Erik L.; Magnusson, Dan A.; Nilson, Nils B.; and Nilsson, Ake S., 4,695,272, Cl. 604-84.000.
Nilsson, Sture. Heating stove and method for the combustion of fuels in heating stoves. 4,694,817, Cl. 126-76.000.
Nineberg, Edward; and Menaker, Mark, to ML Corporation. Dump chute assembly. 4,694,947, Cl. 193-34.000.
Ninomiya, Kunihiro; Nitta, Issei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, to Mitsubishi Chemical Industries Limited. Thieno[2,3-d]pyrimidine derivatives and salts thereof. 4,695,568, Cl. 514-258.000.
Nippon Kogaku K. K.: *See*—
Ogasawara, Akira, 4,695,150, Cl. 354-448.000.
Terui, Nobuhiko; and Takahata, Hisatoshi, 4,695,148, Cl. 354-413.000.
Nippon Kogaku K.K.: *See*—
Kawahara, Atsushi; and Takatsu, Norihiko, 4,696,021, Cl. 377-58.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Ouchi, Chiaki; Niikura, Masakazu; and Suenaga, Hiroyoshi, 4,694,985, Cl. 228-235.000.
Nippon Soken, Inc.: *See*—
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.
Takagi, Shigeru, 4,695,300, Cl. 55-485.000.
Nippon Steel Corporation: *See*—
Kudou, Takenori, 4,695,042, Cl. 266-226.000.
Nippon Tansan Gas Co., Ltd.: *See*—
Fumino, Ichiro, 4,694,850, Cl. 137-318.000.
Nippon Telegraph and Telephone Corporation: *See*—
Satoh, Hidetaka; Kurosawa, Hideyuki; Kamijoh, Yoshiaki; and Jyumonji, Hiromichi, 4,695,916, Cl. 361-56.000.
Nippondenso Co., Ltd.: *See*—
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.
Okajima, Atushi; Yoshida, Hitoshi; Takeuchi, Yukihisa; and Fukutani, Masanori, 4,695,301, Cl. 55-523.000.
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, to Nippondenso Co., Ltd.; Toyota Jidosha Kabushiki Kaisha; and Nippon Soken, Inc. Small-sized spark plug having a spark gap parallel to an axis running through the center electrode. 4,695,758, Cl. 313-130.000.
Nishihama, Takamichi; Okada, Kotaro; and Kadota, Shigekazu, to Dainippon Screen Mfg. Co., Ltd. Apparatus for securing a photosensitive sheet. 4,695,044, Cl. 269-21.000.
Nishikawa, Toshihiro: *See*—
Abe, Akira; Nakajima, Junya; and Nishikawa, Toshihiro, 4,695,529, Cl. 430-351.000.
Nishimoto, Tsuneo: *See*—
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; and Ishida, Toru, to Matsushita Electric Industrial Co., Ltd. Thick film conductor composition. 4,695,403, Cl. 252-513.000.
Nishimura, Yukinobu: *See*—
Wataya, Seiji; Shimomura, Setsuhiro; and Nishimura, Yukinobu, 4,694,806, Cl. 123-494.000.
Nishimura, Yukuo: *See*—
Hirai, Yutaka; Haruta, Masahiro; Nishimura, Yukuo; Matsuda, Hiroshi; and Nakagiri, Takashi, 4,695,717, Cl. 250-213.00R.
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Hiraka, Masahiro, to Matsushita Electric Industrial Co., Ltd. Method of forming electrically conductive circuit. 4,694,573, Cl. 29-846.000.
Nishitani, Kunihiko: *See*—
Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, 4,695,233, Cl. 418-83.000.
Nishiyama, Hisaki: *See*—
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.
Nishiyama, Shigeru: *See*—
Amemori, Hiroyuki; Nishiyama, Shigeru; and Iwamoto, Tetsuo, 4,694,702, Cl. 73-861.240.
Nissan Motor Company, Limited: *See*—
Hamai, Kyugo, 4,694,797, Cl. 123-339.000.
Hirano, Yoshinori; and Kubozuka, Takao, 4,694,784, Cl. 123-41.120.
Kato, Masaki; and Yamazaki, Tsutomu, 4,694,798, Cl. 123-339.000.
Kawakita, Tsunehiro; and Imajo, Minoru, 4,694,793, Cl. 123-196.00S.
Kikkawa, Masatoshi, 4,694,926, Cl. 180-132.000.
Mori, Yasushi, 4,694,796, Cl. 123-325.000.
Mori, Yasushi, 4,694,807, Cl. 123-501.000.
Morita, Tatsuo, 4,694,800, Cl. 123-425.000.
Muraishi, Masakazu, 4,695,097, Cl. 297-452.000.
Nisshin Steel Co., Ltd.: *See*—
Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,695,516, Cl. 428-623.000.
Nitta, Issei: *See*—
Ninomiya, Kunihiro; Nitta, Issei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, 4,695,568, Cl. 514-258.000.
Nitto Electric Industrial Co., Ltd.: *See*—
Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, 4,695,598, Cl. 523-400.000.
Nixon, Ralph D., to English Electric Valve Company Limited. Display arrangements. 4,695,764, Cl. 313-497.000.
Nixon, Ralph D., to English Electric Valve Company Limited. Display arrangements. 4,695,765, Cl. 313-497.000.
NL Chemicals, Inc.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.
NL Industries, Inc.: *See*—
Russell, Michael K.; Wesenberg, Donald L.; and Leaney, Peter A., 4,694,555, Cl. 29-451.000.
NL Petroleum Products Limited: *See*—
Barr, John D., 4,694,919, Cl. 175-393.000.
Nobutoki, Kazuhiro; and Ono, Kenji, to Matsushita Electric Works, Ltd. Polarized electromagnetic relay. 4,695,813, Cl. 335-78.000.
Nobutugu, Hideo: *See*—
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Ohyo Koken Kogyo Co., Ltd. Local radiation exposure alarm apparatus. 4,695,730, Cl. 250-370.000.
Noda, Yasuhiko, to Alps Electric Co., Ltd. Switch with pivoting clip-type contacts. 4,695,692, Cl. 200-335.000.
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, to Mitsubishi Jukogyo Kabushiki Kaisha. Helical guide apparatus usable for a gear shaper. 4,695,209, Cl. 409-42.000.
Noguchi, Yoji: *See*—
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,695,966, Cl. 364-521.000.
Noguier, Jean P.; and Montaut, Jean P., to Thomson CSF. Gateless protection thyristor with a thick, heavily doped central N-layer. 4,695,863, Cl. 357-38.000.
Nohmi, Kazumasa: *See*—
Ogasawara, Toshitaka; Nohmi, Kazumasa; Honmoh, Masao; and Iseki, Yukito, 4,695,763, Cl. 313-487.000.
Nohren, John E., Jr.; and Downes, Richard T., to Innova/Pure Water Inc. Water treatment apparatus. 4,695,379, Cl. 210-282.000.
Noiri, Hifuo: *See*—
Hattori, Isao; and Noiri, Hifuo, 4,695,242, Cl. 425-376.00R.
Noishiki, Yasuharu: *See*—
Miyata, Teruo; and Noishiki, Yasuharu, 4,695,281, Cl. 623-11.000.
Watanabe, Koji; Okamoto, Miyoshi; Mori, Yuichi; and Noishiki, Yasuharu, 4,695,280, Cl. 623-1.000.
Nomura, Akihiro: *See*—
Matsui, Kunio; Fukase, Hisahiko; and Nomura, Akihiro, 4,694,887, Cl. 164-428.000.
Nomura, Yoshihisa; Suda, Koichi; and Kozawa, Tadashi, to Toyota Jidosha Kabushiki Kaisha; and Aisan Kogyo Kabushiki Kaisha. Sealing construction for slide type vacuum pump with finger portions of spring element pressing cylindrical portion of seal element against cylinder bore. 4,694,734, Cl. 92-130.00R.
Nonaka, Shingo: *See*—
Mori, Masashi; Nonaka, Shingo; and Nagai, Seiji, 4,695,167, Cl. 366-181.000.
Noorily, Peter: *See*—
Strauss, Richard F.; Herb, Phillip; Noorily, Peter; and Rodrigues, Julio, 4,695,679, Cl. 174-117.0FF.
Nordica S.p.A.: *See*—
Baggio, Giorgio; and Balbinot, Renzo, 4,694,592, Cl. 36-117.000.
Norsk Hydro a.s.: *See*—
Clausen, Edvin L., 4,694,898, Cl. 165-171.000.
North American Philips Corporation: *See*—
Morelli, Amedeo J.; and Gaylord, Francis L., 4,694,568, Cl. 29-620.000.
Northern Telecom Limited: *See*—
Sinclair, William J.; Kovats, Tibor F. I.; and Straus, Jozef, 4,695,125, Cl. 350-96.200.
Northrop Corporation: *See*—
Malm, Robert E., 4,695,715, Cl. 250-211.00J.
Norton, Daniel E.: *See*—
Banich, Howard P.; and Norton, Daniel E., 4,694,591, Cl. 36-102.000.
Novatome: *See*—
Libin, Bernard, 4,694,864, Cl. 138-113.000.
Nozue, Kazunobu: *See*—
Suzuki, Hideo; and Nozue, Kazunobu, 4,695,260, Cl. 440-61.000.
NSK-Warner K.K.: *See*—
Hane, Toshiyuki, 4,695,076, Cl. 280-804.000.
Nubson, Richard C., to Data Card Corporation. Card guide apparatus for use in a non-inpact printer. 4,695,850, Cl. 346-76.0PH.
Nukushina, Masanori: *See*—
Takano, Kunio; and Nukushina, Masanori, 4,694,762, Cl. 112-121.120.
Nuovo Pignone S.p.A.: *See*—
Ferrari Aggradi, Gian P.; and Ferrante, Cesare M., 4,695,202, Cl. 405-227.000.

Nygren, Alf S.: *See*—
Agback, Karl H.; Agback, Tamara; and Nygren, Alf S., 4,695,648, Cl. 560-053.000.
Nylund, Olov, to Aktiebolaget ASEA-ATOM. Spacer for fuel rods. 4,695,426, Cl. 376-441.000.
O & K Orenstein & Koppel Aktiengesellschaft: *See*—
Ceylan, Sukru , 4,694,948, Cl. 198-311.000.
O/Y Kyro A/B Tamglass: *See*—
Reunamaki, Pauli T.; Yli-Vakkuri, Erkki P. J.; and Anttonen, Kauko K., 4,695,821, Cl. 338-316.000.
Oberoi, Bhusan K.: *See*—
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.
Obrecht, Georges, to Alsthom. Drilling string for drilling a bent bore, a method of using said string, and a bending device used in said string. 4,694,914, Cl. 175-61.000.
O'Brien, Gerald A., to General Motors Corporation. Method of manufacturing tri-pot universal joint housings. 4,694,676, Cl. 72-348.000.
Ochsner, Rolf H.: *See*—
Everett, Charles J.; and Ochsner, Rolf H., 4,695,829, Cl. 340-586.000.
O'Connell, James P.; Piran, Uri; and Wagner, Daniel B., to Becton Dickinson and Company. Sac or liposome containing dye (sulforhodamine) for immunoassay. 4,695,554, Cl. 436-528.000.
Oda, Koichi; Hatta, Koichi; and Sumitani, Toshihiko, to Sharp Kabushiki Kaisha. Calculator or pocket computer with selectable operational sequence. 4,695,983, Cl. 364-709.000.
Oeckl, Siegfried; Mitschker, Alfred; Lange, Peter M.; and Martinola, Friedrich, to Bayer Aktiengesellschaft. Catalyst resins and process for their preparation. 4,695,556, Cl. 502-11.000.
Oen, Sverre; Poppe, Dag; and Tronsli, Sverre N., to Alcatel N.V. Power supply. 4,695,935, Cl. 363-21.000.
Oertle, Konrad; and Wetter, Hansjurg, to Ciba-Geigy Corporation. Silanes, process for their preparation, and their use. 4,695,643, Cl. 556-428.000.
Oetiker, Hans. Pipe connection. 4,695,080, Cl. 285-334.500.
Oettgen, Herbert F.: *See*—
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.
Officine Meccaniche Pavesi & C. S.p.A.: *See*—
Barrera, Giorgio, 4,694,560, Cl. 29-564.100.
Ogano, Takeo; Komatsuzaki, Takeshi; Shigenari, Ryoichi; and Uesugi, Naomoto, to Honda Giken Kogyo Kabushiki Kaisha. Interlinking control device for brake and clutch in tractor-mounted working machines. 4,694,942, Cl. 192-13.00A.
Ogasahara, Yoshio: *See*—
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.
Ogasawara, Akira, to Nippon Kogaku K. K. Diaphragm-control apparatus for camera. 4,695,150, Cl. 354-448.000.
Ogasawara, Toshitaka; Nohmi, Kazumasa; Honmoh, Masao; and Iseki, Yukito, to Matsushita Electronics Corporation. Reflector type fluorescent lamp for optical apparatus. 4,695,763, Cl. 313-487.000.
Ogawa, Masahiko: *See*—
Chito, Yasuo; and Ogawa, Masahiko, 4,695,778, Cl. 318-314.000.
Ogawa, Masaki: *See*—
Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, 4,695,857, Cl. 357-16.000.
Ogawa, Tetsuya: *See*—
Goto, Yasuyuki; Ogawa, Tetsuya; and Sugimori, Shigeru, 4,695,398, Cl. 252-299.500.
Ogura, Yukio; and Nasu, Seiji, to Hitachi Construction Machinery Co.; and Hitachi Engineering Co., Ltd. Man-machine interface type portable ultrasonic composite measuring apparatus. 4,695,833, Cl. 340-722.000.
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, to Sumitomo Pharmaceuticals Company, Ltd. Phenylserine derivatives and processes for preparing the same. 4,695,580, Cl. 514-412.000.
Ohira, Masaki: *See*—
Moriyama, Masatoshi; and Ohira, Masaki, 4,695,328, Cl. 437-31.000.
Ohkura, Makoto: *See*—
Warabisako, Terunori; Ohkura, Makoto; and Miyao, Masanobu, 4,695,856, Cl. 357-4.000.
Ohlhaber, Ronald L.; and Ulijasz, Thaddeus R., to Cooper Industries, Inc. Hybrid coaxial-optical cable and method of use. 4,695,127, Cl. 350-96.230.
Ohno, Kenzo: *See*—
Ishida, Takao; Yoshida, Yukio; and Ohno, Kenzo, 4,694,607, Cl. 49-25.000.
Ohta, Kenji: *See*—
Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, 4,695,514, Cl. 428-432.000.
Ohta, Kosei: *See*—
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.
Ohtani, Hideaki: *See*—
Kigasawa, Kazuo; Ohtani, Hideaki; Tanaka, Makoto; and Hayashida, Shigeru, 4,695,465, Cl. 424-449.000.
Ohtsuka, Toshikazu: *See*—
Hayase, Yoshio; Ohtsuka, Toshikazu; Ide, Kinya; and Takahashi, Toshio, 4,695,312, Cl. 71-92.000.
Ohtsuki, Tomonari; and Tsurumaki, Kazuyoshi, to Daiichi Denshi Kogyo Kabushiki Kaisha. Electronic card connecting circuit. 4,695,914, Cl. 361-42.000.
Ohwada, Kuniki: *See*—
Enoki, Takatomo; Yamasaki, Kimiyoshi; and Ohwada, Kuniki, 4,694,564, Cl. 437-40.000.
Ohya, Toshikazu: *See*—
Kamiji, Koichi; and Ohya, Toshikazu, 4,695,075, Cl. 280-735.000.
Ohyo Koken Kogyo Co., Ltd.: *See*—
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, 4,695,730, Cl. 250-370.000.
Okabe Co., Ltd.: *See*—
Era, Yoshiyuki; and Kumagai, Yasuo, 4,695,178, Cl. 403-14.000.
Okabe, Toshihiro: *See*—
Ikeda, Koichi; Nakamura, Kozi; and Okabe, Toshihiro, 4,695,947, Cl. 364-200.000.
Okabe, Yoshio: *See*—
Kodama, Hisashi; and Okabe, Yoshio, 4,695,268, Cl. 474-110.000.
Okada, Kotaro: *See*—
Nishihama, Takamichi; Okada, Kotaro; and Kadota, Shigekazu, 4,695,044, Cl. 269-21.000.
Okajima, Atushi; Yoshida, Hitoshi; Takeuchi, Yukihisa; and Fukutani, Masanori, to Nippondenso Co., Ltd. Porous ceramic monoliths. 4,695,301, Cl. 55-523.000.
Okamoto, Akihiko: *See*—
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.
Okamoto, Hiroshi: *See*—
Inaji, Toshio; Okamoto, Hiroshi; and Yokobori, Nobuyoshi, 4,695,907, Cl. 360-107.000.
Okamoto, Miyoshi: *See*—
Watanabe, Koji; Okamoto, Miyoshi; Mori, Yuichi; and Noishiki, Yasuharu, 4,695,280, Cl. 623-1.000.
Okamura, Youji: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.
Okawa, Koji: *See*—
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
O'Keeffe, Andrew F. Liquid chromatographic detector and method. 4,695,555, Cl. 436-150.000.
Okino, Tadashi: *See*—
Saito, Syuichiro; and Okino, Tadashi, 4,695,894, Cl. 358-228.000.
Okumura, Katsuhiro, to Toyota Jidosha Kabushiki Kaisha. Construction of door frame in motor vehicle. 4,694,611, Cl. 49-441.000.
Okumura, Shinichi; and Okumura, Yasushi, to Okumura, Shinichi. Boiler apparatus utilizing exhaust gas heat. 4,694,891, Cl. 165-41.000.
Okumura, Yasushi: *See*—
Okumura, Shinichi; and Okumura, Yasushi, 4,694,891, Cl. 165-41.000.
Okuno, Akiyasu; Watanabe, Masakazu; and Ikoma, Kazuhiko, to NGK Spark Plug Co., Ltd. Composite layer aluminum nitride base sintered body. 4,695,517, Cl. 428-698.000.
Okura Industrial Co., Ltd: *See*—
Kondo, Kazuo; Ishiguro, Nobuya; and Tada, Teruo, 4,695,491, Cl. 428-35.000.
Okuyama, Gen: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.
Olbrich, Juergen; Biethan, Uwe; and Sorge, Gernold, to Huels Aktiengesellschaft. Powder varnish compositions containing carboxy curing agents. 4,695,613, Cl. 525-533.000.
Old, Lloyd J.: *See*—
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.
O'Leary, Raymond P., to S&C Electric Company. Pre-insertion inductor arrangement. 4,695,918, Cl. 361-58.000.
Olin Corporation: *See*—
Berkowitz, Phillip T., 4,695,596, Cl. 521-137.000.
Thomas, Karen A., 4,694,753, Cl. 102-289.000.
Woodard, Kenneth E., Jr.; Dean, Robert A.; Fair, David L.; and Fister, Julius C., Jr., 4,695,359, Cl. 204-255.000.
Olmstead, John A., to RCA Corporation. Constant ratio, size insensitive, capacitor structure. 4,695,922, Cl. 361-329.000.
Omet, Reinhard; Kindsvater, Hans; and Wall, Hans J., to Phonix Armaturen-Werke Bregel GmbH. Magneto-optic measuring device. 4,695,796, Cl. 324-226.000.
Omholt, Ray E. Resiliently-cushioned adhesively-applied floor system and method of making the same. 4,694,627, Cl. 52-390.000.
OnLine Computer Systems Inc.: *See*—
Massingill, Larry W.; and Perkins, Derrick O., 4,695,805, Cl. 328-72.000.
Ono, Kenji: *See*—
Nobutoki, Kazuhiro; and Ono, Kenji, 4,695,813, Cl. 335-78.000.
Onodera, Tamio: *See*—
Sumitani, Koji; Sakai, Tokuji; Yamasaki, Yasuo; and Onodera, Tamio, 4,695,667, Cl. 585-481.000.
Ontario Die Company Limited: *See*—
Levene, Martin M.; and Lessard, William W., 4,694,719, Cl. 83-451.000.

Optiques Compagnie Lyonnaise de Tranmissions: *See*—
Hakoun, Roland; and Jurczyszyn, Michel, 4,695,306, Cl. 65-152.000.
Orrling, Bengt, to ASEA Aktiebolag. Self-baking electrodes. 4,696,014, Cl. 373-89.000.
Osborg, Hans. Motor fuel compositions and methods. 4,695,292, Cl. 44-64.000.
Oscarson, Edward M.: *See*—
Tulpule, Bhalchandra R.; Oscarson, Edward M.; and Vosgien, David J., 4,696,019, Cl. 375-107.000.
Osgood, Roderic L., to Santa Barbara Research Center. Voltage calibration in E-beam probe using optical flooding. 4,695,794, Cl. 324-158.00R.
Oshikoshi, Yuji; Kato, Masashi; and Kikuchi, Hisashi, to Fuji Photo Film Co., Ltd. Instant photographic apparatus. 4,695,143, Cl. 354-86.000.
Osteonics Corp.: *See*—
Forte, Mark R.; Khowaylo, Alex; and Schloesser, Ewald, 4,695,282, Cl. 623-22.000.
Oswald, Thomas, to STC plc. Optical transmission systems. 4,696,060, Cl. 455-601.000.
Ota, Hideo: *See*—
Seto, Youichi; Homma, Koichi; Komura, Fuminobu; and Ota, Hideo, 4,695,964, Cl. 364-518.000.
Otani, Susumu, to NEC Corporation. CN ratio measurement circuit. 4,696,057, Cl. 455-226.000.
Otani, Takeji: *See*—
Setsuie, Takashi; Otani, Takeji; and Yoshida, Kanji, 4,695,415, Cl. 264-29.200.
Otocka, Edward P.: *See*—
Ponticello, Ignazio S.; and Otocka, Edward P., 4,695,532, Cl. 430-533.000.
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, to Takasago Perfumery Co., Ltd. Process for the preparation of enamines or imines. 4,695,631, Cl. 544-170.000.
Otsuki, Hajime: *See*—
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.
Ott, Hubert: *See*—
Gugel, Bernd; Niebel, Harald; and Ott, Hubert, 4,695,174, Cl. 400-124.000.
Otte, Werner; and Nehring, Rudolf, to Huls Aktiengesellschaft. Method of producing cyclohexyl compounds. 4,695,660, Cl. 568-830.000.
Ouchi, Chiaki; Niikura, Masakazu; and Suenaga, Hiroyoshi, to Nippon Kokan Kabushiki Kaisha. Method of producing titanium clad steel plate by hot rolling. 4,694,985, Cl. 228-235.000.
Outboard Marine Corporation: *See*—
Broughton, George L.; and Macier, James E., 4,695,261, Cl. 440-900.000.
Overman, Patrick, Sr.; and Baird, Elldon. Playpen sun cover. 4,694,516, Cl. 5-93.00R.
Overmyer, Thad J. Method of cooling and lubricating human hard tissue during power tool cutting. 4,695,255, Cl. 433-215.000.
Owen, Steven M. Welder's hood having a chin operated window closure. 4,694,507, Cl. 2-8.000.
Oxford Lasers Limited: *See*—
Kearsley, Andrew J., 4,696,011, Cl. 372-61.000.
Oxley, Donald W.: *See*—
Thatte, Satish; and Oxley, Donald W., 4,695,949, Cl. 364-200.000.
Oyama, Fusami: *See*—
Kurokawa, Ryogo; Oyama, Fusami; and Takahashi, Akira, 4,695,069, Cl. 280-91.000.
Ozaki, Yoshio; Tsurumoto, Kazuo; Yatomi, Takeshi; and Yamamoto, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Electric discharge machine with control of the machining pulse's current value in accordance with the delay time. 4,695,696, Cl. 219-69.00P.
Ozawa, Masakazu: *See*—
Ichihashi, Hiroo; Ozawa, Masakazu; Ebinuma, Ryuichi; and Saito, Atsushi, 4,695,855, Cl. 346-145.000.
Ozeki, Kiyoshi: *See*—
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, 4,695,730, Cl. 250-370.000.
Paal, Ernest F., to Exxon Production Research Company. Method for establishing a surface consistent correction for the effects of the low velocity layer in seismic data processing. 4,695,984, Cl. 367-54.000.
Pacific Bell: *See*—
Schembri, John J., 4,696,063, Cl. 455-612.000.
Padalino, Marco, to Ricoh Co., Ltd.; and Ricoh Systems, Inc. Inkjet printing system. 4,695,848, Cl. 346-1.100.
Paine, Christopher G.; White, William J.; and Resnick, Susan J., to Honeywell Inc. Backside mosaic photoconductive infrared detector array. 4,695,861, Cl. 357-30.000.
Pal, Uday B.: *See*—
Knauss, William F., Jr.; Pal, Uday B.; and Patil, Balaji V., 4,695,318, Cl. 75-51.100.
Palac, Kazimir, to Zenith Electonics Corporation. Method of screening a flat mask cathode ray tube. 4,695,523, Cl. 430-23.000.
Palicot, Jacques P.; and Dublet, Guy P., to Etablissement Public de Diffusion dit Telediffusion de France. Echo correction especially for television broadcast systems. 4,696,015, Cl. 375-14.000.
Panarotto, Gianfranco: *See*—
Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, 4,696,001, Cl. 370-88.000.
Pandrol Limited: *See*—
Jones, Robert; Jones, Keith W.; and Baxter, William R. S., 4,694,690, Cl. 73-146.000.
Panthel, Guenter: *See*—
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.
Papamichalis, Panos E.: *See*—
Doddington, George R.; and Papamichalis, Panos E., 4,696,040, Cl. 381-46.000.
Papper, Ernest G.: *See*—
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.
Parma Corporation: *See*—
Rogers, Walter C., Jr., 4,694,515, Cl. 5-13.000.
Parnell, Raymond, to Tomorrow Group, Inc., The. Modular panels for a display apparatus. 4,694,965, Cl. 211-87.000.
Pass, Raymond V.: *See*—
Ney, Reuben E.; Pass, Raymond V.; and Yeager, Patrick F., 4,695,105, Cl. 439-95.000.
Patchett, Arthur A.: *See*—
Kollonitsch, Janos; and Patchett, Arthur A., 4,695,588, Cl. 514-538.000.
Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH: *See*—
Wittmann, Horst, 4,695,767, Cl. 315-58.000.
Patil, Balaji V.: *See*—
Knauss, William F., Jr.; Pal, Uday B.; and Patil, Balaji V., 4,695,318, Cl. 75-51.100.
Patraw, Nils E., to Hughes Aircraft Company. Inverted chip carrier. 4,695,870, Cl. 357-74.000.
Paugh, Charles E.: *See*—
Anderson, Paul T.; Irwin, Lawrence; Matthews, John C.; and Paugh, Charles E., 4,694,634, Cl. 53-88.000.
Paul, Patrick R. D.; and Price, James H., to SSI Medical Services, Inc. Patient support apparatus. 4,694,520, Cl. 5-453.000.
Paurat, Friedrich W.; and Paurat, Roland. Excavator, particularly for continuous strip mining of minerals. 4,695,098, Cl. 299-64.000.
Paurat, Roland: *See*—
Paurat, Friedrich W.; and Paurat, Roland, 4,695,098, Cl. 299-64.000.
Pawelek, John M., to Yale University. Composition and method for treatment of melanomas. 4,695,449, Cl. 424-1.100.
Payne, William A., III, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Nonblocking self-routing packet and circuit switching network. 4,696,000, Cl. 370-60.000.
Pearch, Dean A.; and Pung, Thomas F., to Dana Corporation. Clutch assembly for a diesel engine blower. 4,694,946, Cl. 192-85.0AA.
Pearlman, Jay S.: *See*—
Dunn, Joseph E.; and Pearlman, Jay S., 4,695,472, Cl. 426-237.000.
Pearson, Andrew D.: *See*—
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.
Pekelis, Boris L.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.
Pelgrom, Marcellinus J. M., to U.S. Philips Corporation. Charge sensor having a preset flipflop. 4,695,753, Cl. 307-530.000.
Peltier, Bernard P. J. M., to PRAD Research & Development N.V. Drilling monitor with downhole torque and axial load transducers. 4,695,957, Cl. 364-422.000.
Penin, Vladimir A.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.
Pennebaker, William B.: *See*—
Anastassiou, Dimitris; and Pennebaker, William B., 4,695,884, Cl. 358-163.000.
Pentapharm AG: *See*—
Wilder, Martin S., 4,695,456, Cl. 424-94.500.
Pereira, Ruy J.: *See*—
Vlakancic, Connor G.; Pereira, Ruy J.; and Goodman, Larry R., 4,694,694, Cl. 73-386.000.
Perkin-Elmer Corporation, The: *See*—
Veneklasen, Lee H.; and Yagunoff, Guy G., 4,695,773, Cl. 315-382.000.
Perkins, Derrick O.: *See*—
Massingill, Larry W.; and Perkins, Derrick O., 4,695,805, Cl. 328-72.000.
Permyakov, Nikolai K.: *See*—
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.
Perna, Fred P. Foldable eyeshade. 4,694,506, Cl. 2-12.000.
Perner, Johannes: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang. 4,695,397, Cl. 252-182.000.
Pershak, William C.: *See*—
Phipps, Cornelius M.; and Pershak, William C., 4,694,960, Cl. 206-469.000.
Personnat, Jean C. M.: *See*—
Poldervaart, Leendert; and Personnat, Jean C. M., 4,694,771, Cl. 114-230.000.
Pesavento, Philip. Photoconductive power switch. 4,695,733, Cl. 250-551.000.
Pesch, Wilfried, to MTU Motoren- und Turbinen-Union Muenchen GmbH. Method and apparatus for detecting flaws in single crystal test samples. 4,696,024, Cl. 378-73.000.
Peters, Klaus-Jurgen, to Robert Bosch GmbH. Method and fuel injection system for fuel supply to a mixture-compressing internal combustion engine having externally supplied ignition. 4,694,808, Cl. 123-453.000.
Peters, Mary A.: *See*—
Alton, Norman K.; Peters, Mary A.; Stabinsky, Yitzhak; and Snitman, David, 4,695,623, Cl. 530-351.000.
Peterson, Dean M., to Eastman Kodak Company. Variable speed video camera. 4,695,887, Cl. 358-213.130.
Peterson, Dean M., to Eastman Kodak Company. Video camera with automatically variable diaphragm and shutter speed control. 4,695,888, Cl. 358-213.130.
Peterson, Dean M., to Eastman Kodak Company. Variable speed video camera. 4,695,891, Cl. 358-213.130.
Peterson, Gary R.: *See*—
Levine, Peter A.; Cobb, Arthur L., Jr.; Johnson, Cydney A.; and Peterson, Gary R., 4,695,878, Cl. 358-44.000.
Petrak, Harry A., to Boulder 12 Investments. Ground clutch assembly with dynamic engagement and disengagement. 4,694,943, Cl. 192-35.000.
Petri, Heinz: *See*—
Essig, Willi; and Petri, Heinz, 4,695,816, Cl. 337-394.000.
Petrini, Roland; and Morell, Joseph, to Salomon S.A. Ski boot with spring action flex control. 4,694,593, Cl. 36-120.000.
Pettenati, Enrico: *See*—
Albizzati, Enrico; Pettenati, Enrico; Zucchini, Umberto; and Cuffiani, Illaro, 4,695,558, Cl. 502-123.000.
Pettibone, Craig R.; and Berry, Jimmy D., to Specialty Products, Inc. Toe and camber adjusting system. 4,695,073, Cl. 280-690.000.
Pfaff Industriemaschinen GmbH: *See*—
Diehl, Konrad, 4,694,765, Cl. 112-254.000.
Pfizer Inc.: *See*—
Brighty, Katherine E., 4,695,626, Cl. 540-214.000.
Melvin, Lawrence S., 4,695,571, Cl. 514-275.000.
Schnur, Rodney C., 4,695,634, Cl. 544-300.000.
Phaal, Cornelius. Method of making a blank of a drill bit. 4,694,710, Cl. 76-108.00R.
Pharmacia AB: *See*—
Agback, Karl H.; Agback, Tamara; and Nygren, Alf S., 4,695,648, Cl. 560-053.000.
Hellgren, Lars G. I.; Mohr, Viggo; and Vincent, Jan G., 4,695,457, Cl. 424-94.000.
Philion, Richard E., to Sterling Drug Inc. Alpha-(aminoalkyl-4-hydroxy-3-(alkylthio)benzenemethanols. 4,695,589, Cl. 514-653.000.
Phillips Petroleum Company: *See*—
Cobb, Raymond L., 4,695,671, Cl. 585-858.000.
Scinta, James, 4,695,214, Cl. 414-221.000.
Phipps, Cornelius M.; and Pershak, William C., to Plastic Specialties, Inc. Tear open blister package. 4,694,960, Cl. 206-469.000.
Phonix Armaturen-Werke Bregel GmbH: *See*—
Omet, Reinhard; Kindsvater, Hans; and Wall, Hans J., 4,695,796, Cl. 324-226.000.
Photon Marketing Limited: *See*—
Carter, George A., III; and Dooley, James L., 4,695,058, Cl. 273-311.000.
Pialet, Joseph W.: *See*—
Koch, Frederick W.; and Pialet, Joseph W., 4,695,390, Cl. 252-47.500.
Picker International, Inc.: *See*—
Blakeley, Douglas M.; Kershaw, Carolyn A.; and Gangarosa, Raymond E., 4,694,837, Cl. 128-653.000.
Pickering, John F.: *See*—
Yardley, Alfred; and Pickering, John F., 4,694,651, Cl. 60-578.000.
Piels, Barry Y.: *See*—
Simmel, Thomas L.; Crossley, David W.; and Morehouse, Mark N., 4,695,267, Cl. 446-462.000.
Pierce, Lyle R. Multi-function switch-controlled lamp circuit. 4,695,739, Cl. 307-141.000.
Pierrat, Frank A.: *See*—
Shutske, Gregory M.; and Pierrat, Frank A., 4,695,573, Cl. 514-290.000.
Pike, Russell E.: *See*—
Rane, Dinanath F.; Desai, Jagdish A.; and Pike, Russell E., 4,695,579, Cl. 514-397.000.
Pikus, Evgeny A.: *See*—
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.
Pilgrim, J. Cole. Reversible archery target. 4,695,060, Cl. 273-404.000.
Pins, Heinrich: *See*—
Bauer, Kurt H.; and Pins, Heinrich, 4,695,450, Cl. 424-22.000.
Pinto, Akiva; and Lucassen, Guenter, to Hergeth Hollingsworth GmbH. Feed apparatus for cards, carding engines, and the like. 4,694,538, Cl. 19-105.000.
Pinto, Alwyn; and Johnson, John B. H., to Imperial Chemical Industries PLC. Ammonia synthesis process. 4,695,442, Cl. 423-359.000.
Pioneer Electronic Corporation: *See*—
Koizumi, Toshiaki, 4,695,995, Cl. 369-75.200.
Komatsubara, Masahiro; Kamimura, Tetsuro; Inanaga, Takugi; and Takahashi, Akira, 4,695,011, Cl. 242-199.000.
Kotaka, Fumitaka; and Maeda, Takanori, 4,695,158, Cl. 356-123.000.
Moriyama, Yoshiaki, 4,696,007, Cl. 371-37.000.
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, to Henkel Kommanditgesellschaft auf Aktien. Control of disalt in α-sulfofatty acid ester surfactants. 4,695,409, Cl. 260-400.000.
Piran, Uri: *See*—
O'Connell, James P.; Piran, Uri; and Wagner, Daniel B., 4,695,554, Cl. 436-528.000.
Pitney Bowes Inc.: *See*—
Cruz-Uribe, Antonio S., 4,695,854, Cl. 346-140.00R.
Pittard, Gerard T.: *See*—
McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., 4,694,913, Cl. 175-61.000.
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., to International Flavors & Fragrances Inc. Flavoring with gem dithioethers of phenylalkanes. 4,695,473, Cl. 426-535.000.
Place, John M.: *See*—
Ackman, Terry E.; and Place, John M., 4,695,378, Cl. 210-198.100.
Plastic Specialties, Inc.: *See*—
Phipps, Cornelius M.; and Pershak, William C., 4,694,960, Cl. 206-469.000.
Plavac, Frank, to Chevron Research Company. Poly(oxyalkylene) aminoether carbamates as deposit control additives. 4,695,291, Cl. 44-62.000.
Plessey Overseas Limited: *See*—
Verity, Philip R., 4,695,937, Cl. 363-25.000.
Plobst, Dietmar: *See*—
Klepsch, Wilhelm; and Plobst, Dietmar, 4,695,239, Cl. 425-194.000.
Plouff, Donald A., to General Telephone Company of Indiana. Multiplexed terminal for monitoring and controlling a plurality of remote telephone switches. 4,696,026, Cl. 379-34.000.
Plumb, Edwin W., to Pressmate, Inc. Side by side air feeder for advancing stock to a power press and the like. 4,694,982, Cl. 226-115.000.
Podiak, Richard S., to Champion Spark Plug Company. Method for producing a composite center electrode and an electrode. 4,695,759, Cl. 313-136.000.
Polaroid Corporation: *See*—
Mahapatra, Amaresh; McMahon, Donald H.; Robinson, William C.; and Sanford, Norman A., 4,695,121, Cl. 350-96.120.
Poldervaart, Leendert; and Personnat, Jean C. M., to Single Buoy Moorings Inc. Mooring device. 4,694,771, Cl. 114-230.000.
Pollak, Gerd, to L. & C. Steinmuller GmbH. Unit for guiding the flow of cold gas in steam generators of high-temperature reactors. 4,694,893, Cl. 165-104.340.
Pomponio, Edward V.: *See*—
Wingler, William C.; and Pomponio, Edward V., 4,695,683, Cl. 200-38.00R.
Pond, Richard J.: *See*—
Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., 4,695,190, Cl. 405-169.000.
Ponticello, Ignazio S.; and Otocka, Edward P., to Eastman Kodak Company. Photographic silver halide element containing new adhesion promoting polymeric materials and polyester support. 4,695,532, Cl. 430-533.000.
Pool, Daniel L., to Minnesota Mining and Manufacturing. Paper converting machine. 4,695,006, Cl. 242-56.300.
Poole, Alan: *See*—
Sandbach, Rex H.; and Poole, Alan, 4,694,776, Cl. 118-500.000.
Pope, Ralph E. Rotatable building. 4,694,620, Cl. 52-65.000.
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., to DSO "Elprom". Permanent magnet rotor for an electrical machine. 4,695,754, Cl. 310-156.000.
Poppe, Dag: *See*—
Oen, Sverre; Poppe, Dag; and Tronsli, Sverre N., 4,695,935, Cl. 363-21.000.
Porter, John R. Crop harvesting and soil tilling apparatus. 4,694,641, Cl. 56-328.00R.
Portmann, Jacques, to Thomson CSF. Charge accumulation read-out device with simultaneously read multiple output signals. 4,695,889, Cl. 358-213.260.
Postron Corp.: *See*—
Johnson, Terry W.; Harms, Daryl E.; and Curl, Ricky L., 4,695,880, Cl. 358-86.000.
Power-Flo Products Corporation: *See*—
Simonette, Dallas W.; and Wiener, Bruce A., 4,695,176, Cl. 401-144.000.
Powers, Joseph: *See*—
Trocciola, John C.; Powers, Joseph; and Martin, Ronald G., 4,695,518, Cl. 429-12.000.

PRAD Research & Development N.V.: *See*—
Peltier, Bernard P. J. M., 4,695,957, Cl. 364-422.000.
Precitronic Gesellschaft: *See*—
Eichweber, Kurt, 4,695,256, Cl. 434-22.000.
Precor Incorporated: *See*—
Smith, David B.; and Miller, Randolph F., 4,695,050, Cl. 272-72.000.
Predohl, Wilhelm; Beisemann, Heinz; and Reitemeyer, Paul, to Reifenhauser GmbH & Co. Maschinenfabrik. Apparatus for continuous extrusion of a multilayer synthetic resin web. 4,695,236, Cl. 425-131.100.
Premel, Ulrich; Dorling, Rolf; and Schultze, Manfred, to L. & C. Steinmuller GmbH. Process and apparatus for producing high-pressure and superheated steam. 4,694,782, Cl. 122-7.00R.
Press Technology Corporation: *See*—
Zeitlin, Alexander; and Zandel, Adam, 4,694,678, Cl. 72-455.000.
Pressman, Eric, to General Electric Company. Modified flame retardant polyphenylene ether resins having improved foamability and molded articles made therefrom. 4,695,594, Cl. 521-92.000.
Pressmate, Inc.: *See*—
Plumb, Edwin W., 4,694,982, Cl. 226-115.000.
Preston, Frank S.: *See*—
Blair, Preston E.; and Preston, Frank S., 4,695,953, Cl. 364-410.000.
Pretre, Roger, to Moore Business Forms, Inc. Automobile insurance card. 4,695,077, Cl. 283-81.000.
Prevorsek, Dusan C.: *See*—
Li, Hsin L.; and Prevorsek, Dusan C., 4,695,240, Cl. 425-207.000.
Preysman, Vladimir, to Verbatim Corporation. Hub hole characterization system. 4,695,982, Cl. 364-506.000.
Price, James H.: *See*—
Paul, Patrick R. D.; and Price, James H., 4,694,520, Cl. 5-453.000.
Prime Computer, Inc.: *See*—
Sullivan, Roderick B., II; Doshi, Mahesh; and Cooper, Lorne, 4,695,968, Cl. 364-578.000.
Prince, Alfred M.; and Kim, Kwang S., to New York Blood Center, Inc.; and Eugene Tech International, Inc. Process for preparing hepatitis B surface antigen containing particles in novel forms which are highly immunogenic. 4,695,454, Cl. 424-89.000.
Probst, Jon D.: *See*—
Ackelson, Donald B.; Moorehead, Eric L.; Ward, John W.; and Probst, Jon D., 4,695,365, Cl. 208-89.000.
Procter & Gamble Company, The: *See*—
Curro, John J.; Trusty, Alan J.; and Vernon, George M., 4,695,422, Cl. 264-504.000.
Lawson, Michael I., 4,695,278, Cl. 604-385.00A.
Proctor, Edward A. Gang form. 4,695,031, Cl. 249-91.000.
Proctor, John D.; Towns, Edward J.; and Brown, Edward M., to Lermer Packaging Corp. Tightly sealing safety cap. 4,694,968, Cl. 215-224.000.
Product Design & Development, Inc.: *See*—
Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., 4,694,552, Cl. 29-418.000.
Profit Technology, Inc.: *See*—
Bedrij, Orest J., 4,695,975, Cl. 364-900.000.
Proton AG: *See*—
Samhaber, Wolfgang; and Renn, Werner, 4,695,551, Cl. 435-292.000.
Provence, John D.; Brown, Frederick W.; and Jones, John I., to Texas Instruments Incorporated. Dual detector system for determining endpoint of plasma etch process. 4,695,700, Cl. 219-121.0PD.
Pruden, Charles W.; McEvoy, Alfred P.; and McEvoy, Charles S., to Western Extrusions Corporation. Wood-clad aluminum window frame and associated window assembly. 4,694,612, Cl. 49-445.000.
Pruneda, Domingo C., to Lucas Industries Public Limited Company. Governor mechanism. 4,694,795, Cl. 123-373.000.
Pruzina, Christoph: *See*—
Nicklas, Hans; and Pruzina, Christoph, 4,694,626, Cl. 52-309.120.
PSI Star: *See*—
Battey, James F.; Nelson, Norvell J.; and Barnett, Daniel J., 4,695,348, Cl. 156-647.000.
Pulkkinen, Jorma, to Neste Oy. Lined rock cistern or tunnel. 4,695,188, Cl. 405-150.000.
Pullman Rail Leasing Inc.: *See*—
Miller, Roy W., 4,695,207, Cl. 406-130.000.
Pung, Thomas F.: *See*—
Pearch, Dean A.; and Pung, Thomas F., 4,694,946, Cl. 192-85.0AA.
Purcaru, Bebe-Titu, to Kraftwerk Union Aktiengesellschaft. Turbomachine blade. 4,695,228, Cl. 416-223.00A.
Purusar Corporation: *See*—
Grebinski, Thomas J., 4,695,327, Cl. 134-11.000.
Pust, Klaus O. M. Revolver handgun. 4,694,602, Cl. 42-59.000.
Pylkki, Russell J.: *See*—
Heikkila, Kurt E.; Williams, Rodney K.; and Pylkki, Russell J., 4,694,682, Cl. 73-61.10C.
Quick, Robert G., Jr.: *See*—
Lau, Robert S.; Murphy, Roy E.; and Quick, Robert G., Jr., 4,695,772, Cl. 315-370.000.
R. C. Ltd.: *See*—
Ford, George A., 4,694,916, Cl. 175-249.000.
R. Goodwin International Ltd.: *See*—
Goodwin, Richard S., 4,694,853, Cl. 137-512.100.
R. W. Lyall & Company, Inc.: *See*—
Lyall, Lucian H., 4,695,335, Cl. 156-64.000.
Raasch, Hans, to W. Schlafhorst & Co. Driven thread storage device. 4,695,002, Cl. 242-47.010.
Rabe, George B., to Foster Wheeler Energy Corporation. Method for remotely replacing tube ends in a heat exchanger. 4,694,549, Cl. 29-157.30C.
Rabe, George B., to Foster Wheeler Energy Corporation. Elongated tube expander tool. 4,694,677, Cl. 72-393.000.
Rabon, Joe D.; and Haro, Rudy, to Southern California Edison. Microcomputer controlled power regulator system and method. 4,695,737, Cl. 307-31.000.
Rada, David C. Method for preparing tissue sections. 4,695,339, Cl. 156-80.000.
Radkov, Peyu V.: *See*—
Popov, Eatcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.
Rae, Malcolm C.: *See*—
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.
Raets, Hubert C., to U.S. Philips Corporation. Circuit for switching current in an inductive load. 4,695,770, Cl. 315-207.000.
Ragnegard, Samuel, to AB Hedemora Verkstader. Filter for continuous filtering of a suspension under pressure. 4,695,381, Cl. 210-403.000.
Rahmede, Karl-Heinz; and Stemmer, Horst-Heinz, to TRW Ehrenreich GmbH & Co. KG. Ball joint. 4,695,181, Cl. 403-135.000.
Raines, Max: *See*—
Wickers, Francis A.; and Raines, Max, 4,694,766, Cl. 112-262.100.
Ramaprasad, K. R., to Chronar Corporation. Hetero-augmentation of semiconductor materials. 4,695,331, Cl. 437-126.000.
Ramiller, Charles L.: *See*—
Hammond, Martin L.; and Ramiller, Charles L., 4,694,779, Cl. 118-730.000.
Ramotar, Jay G.: *See*—
Mikhailovsky, Leonid; and Ramotar, Jay G., 4,695,187, Cl. 405-124.000.
Rampen, William H. S. Hydraulic control valves. 4,694,849, Cl. 137-312.000.
Randall, Bruce E., to Sangamo Weston, Inc. Charge balance voltage-to-frequency converter utilizing CMOS circuitry. 4,695,742, Cl. 307-271.000.
Randklev, Ronald M., to Minnesota Mining and Manufacturing Company. Orthodontic bracket adhesive and abrasive for removal thereof. 4,695,251, Cl. 433-8.000.
Randolph, Barney J.: *See*—
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.
Rane, Dinanath F.; Desai, Jagdish A.; and Pike, Russell E., to Schering Corporation. Antifungal 2-azolylmethyl-3-difluorobenzyloxy-2,3-dihydrofluoro-benzo(B) thiophens. 4,695,579, Cl. 514-397.000.
Rank, Kenneth A., Jr. Display carton. 4,694,955, Cl. 206-45.290.
Rao, T. V.; and Samec, Robert C., to Medtronic, Inc. Electrochemical cell construction and fill method. 4,695,519, Cl. 429-52.000.
Ratchford, Lloyd G., to Allied Corporation. Quick release connector. 4,695,109, Cl. 439-155.000.
Rawlings, Kirk A., to Wausau Metals Corporation. Apparatus for stripping paint. 4,694,546, Cl. 29-81.00D.
Ray Industries, Inc.: *See*—
Greenberg, Robert, 4,695,183, Cl. 403-356.000.
Raychem Corp.: *See*—
Lawrence, Alvah A.; and Neves, Jason W., 4,695,676, Cl. 174-22.00R.
Raytheon Company: *See*—
Waterman, John K., 4,695,766, Cl. 315-3.500.
Razavi, Homaune A.: *See*—
Walba, David M.; and Razavi, Homaune A., 4,695,650, Cl. 560-109.000.
RCA Corporation: *See*—
Chase, Thomas L.; and Long, Kenneth A., 4,695,045, Cl. 269-152.000.
Fisher, Albert W., 4,695,868, Cl. 357-68.000.
Giordano, Raymond L., 4,695,744, Cl. 307-279.000.
Levine, Peter A.; Cobb, Arthur L., Jr.; Johnson, Cydney A.; and Peterson, Gary R., 4,695,878, Cl. 358-44.000.
McClelland, Sandra K.; Conrad, Neal D.; and Desai, Nitin V., 4,695,490, Cl. 428-1.000.
Olmstead, John A., 4,695,922, Cl. 361-329.000.
Ritzman, Ira G.; and Wright, Joseph W., 4,695,775, Cl. 315-410.000.
Redland Roof Tiles Limited: *See*—
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.
Reed, Larry T., to Axia Incorporated. Automatic ranging gun sight. 4,695,161, Cl. 356-254.000.
Reh, Kuno; and Schophoff, Friedrich, to Cassella Aktiengesellschaft. Process for the preparation of 2,4-dinitrophenyl ethers. 4,695,656, Cl. 568-587.000.
Reichert, William W.: *See*—
Finlayson, Claude M.; Cody, Charles A.; Kemnetz, Steven J.; Reichert, William W.; Magauran, Edward D.; and Johnson, Johnny R., 4,695,402, Cl. 252-315.200.
Reid Manufacturing Co., Inc.: *See*—
Cothery, Jeffrey R., 4,694,576, Cl. 30-280.000.
Reid, Paul A.: *See*—
Barton, James C.; Hefner, Robert E.; Reid, Paul A.; and Sable, Frank R., 4,694,928, Cl. 180-268.000.

Reifenhauser GmbH & Co. Maschinenfabrik: *See*—
Predohl, Wilhelm; Beisemann, Heinz; and Reitemeyer, Paul, 4,695,236, Cl. 425-131.100.

Reilly Tar & Chemical Corporation: *See*—
Toomey, Joseph E., Jr., 4,695,352, Cl. 204-74.000.

Reimann, Jurgen-Andreas; and Basilowski, Herbert, to Siemens Aktiengesellschaft. Method and apparatus for numerical control of machine tools. 4,695,960, Cl. 364-474.000.

Reimann, Udo, to Siemens Aktiengesellschaft. Circuit for rapidly determining the greatest difference among three binary numerical values. 4,695,971, Cl. 364-769.000.

Rein, Hans-Martin, to Telefunken electronic GmbH. Dynamic frequency divider with a mixer stage and an amplifier. 4,695,940, Cl. 363-157.000.

Reinelt, Werner: *See*—
Krieger, Karl; and Reinelt, Werner, 4,694,730, Cl. 91-170.0MP.

Reitemeyer, Paul: *See*—
Predohl, Wilhelm; Beisemann, Heinz; and Reitemeyer, Paul, 4,695,236, Cl. 425-131.100.

Renn, Werner: *See*—
Samhaber, Wolfgang; and Renn, Werner, 4,695,551, Cl. 435-292.000.

Renner, Karl H.; and Morton, Alec J., to Texas Instruments Incorporated. Linear predictive coding technique with interleaved sequence digital lattice filter. 4,695,970, Cl. 364-724.000.

Rennick, Donna: *See*—
Yokota, Takashi; Lee, Frank; Rennick, Donna; and Arai, Ken-ichi, 4,695,542, Cl. 435-68.000.

Repco Limited: *See*—
Grace, William G., 4,695,345, Cl. 156-264.000.

Research Association for Petroleum Alternatives Development: *See*—
Morimoto, Nobuyuki; Takatsu, Kozo; and Sugimoto, Michio, 4,695,440, Cl. 423-328.000.

Research Foundation of State University of New York, The: *See*—
Sachs, Frederick; Auerbach, Anthony; McGarrigle, Richard G.; and Neil, James E., 4,695,709, Cl. 219-494.000.

Resnick, Susan J.: *See*—
Paine, Christopher G.; White, William J.; and Resnick, Susan J., 4,695,861, Cl. 357-30.000.

Reunamaki, Pauli T.; Yli-Vakkuri, Erkki P. J.; and Anttonen, Kauko K., to O/Y Kyro A/B Tamglass. Resistor element assembly for a heating furnace of glass sheets and method of replacing a resistor element. 4,695,821, Cl. 338-316.000.

Reuschling, Dieter: *See*—
Clauss, Karl; Linkies, Adolf; and Reuschling, Dieter, 4,695,629, Cl. 544-2.000.

Revici, Emanuel, to Avram, Elena. Method for relieving pain or producing analgesia. 4,695,583, Cl. 514-449.000.

Reynolds, James E.: *See*—
Kindig, James K.; and Reynolds, James E., 4,695,290, Cl. 44-1.0SR.

Reynolds, William R. Voltage and current limiting phase-triggered battery charger with continuous optimization of charging rate. 4,695,784, Cl. 320-32.000.

Reznik, David. Apparatus and method for drying and curing coated substrates. 4,694,586, Cl. 34-1.000.

Rheinische Braunkohlenwerke AG.: *See*—
Lambertz, Johannes; and Schumacher, Ingo, 4,695,789, Cl. 324-61.00P.

Rhoads, Gary E. Automatic fluid distributing valve timing device. 4,694,787, Cl. 123-90.130.

Rhone-Poulenc Specialites Chimiques: *See*—
Desbois, Michel, 4,695,657, Cl. 568-656.000.

Richard, Pierre, to Bouygues. Concrete structural elements, process and device for manufacturing these elements. 4,694,622, Cl. 52-223.00R.

Richardson, David G.: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.

Richter, Klaus: *See*—
Ehrhardt, Winfried; Richter, Klaus; and Lehr, Adolf, 4,695,047, Cl. 269-309.000.

Ricoh Company, Ltd.: *See*—
Gojo, Tomomi; Yagi, Yoshio; and Izumi, Tsunetada, 4,695,834, Cl. 340-734.000.
Ishikawa, Kazumasa; and Koseki, Yuji, 4,695,898, Cl. 358-296.000.
Itagaki, Masanori; Takahashi, Junichi; and Endou, Hideyasu, 4,695,678, Cl. 174-52.0FP.
Padalino, Marco, 4,695,848, Cl. 346-1.100.
Sakuma, Nobuo, 4,695,132, Cl. 350-409.000.

Ricoh Systems, Inc.: *See*—
Padalino, Marco, 4,695,848, Cl. 346-1.100.

Rieck, Gene W.: *See*—
Beining, August H.; Dial, Larry A.; Smith, William A.; and Rieck, Gene W., 4,695,827, Cl. 340-365.00P.

Rieder, Heinz; and Schwaiger, Max, to EMR Elektronische Messund Regelgerate Gesellschaft m.b.H. Optoelectronic incremental measuring system with adjustable LED positioning. 4,695,720, Cl. 250-231.0SE.

Ries, Gunter: *See*—
Jahnke, Andreas; Ries, Gunter; and Meier, Konrad, 4,694,868, Cl. 140-92.100.

Rigid Form, Inc.: *See*—
Herrmeyer, Dennis C., 4,695,083, Cl. 292-241.000.

Rigotti, Victor H.: *See*—
Levine, Michael R.; Russo, James T.; Cairo, Anthony C.; and Rigotti, Victor H., 4,695,942, Cl. 364-188.000.

Ringer, Thomas R.; and Bramwell, Byrne E., to Canadian Patents and Development Limited. Railroad switch snow deflecting air nozzle apparatus. 4,695,017, Cl. 246-428.000.

Ringgenberg, Paul D., to Halliburton Company. Flapper type annulus pressure responsive tubing tester valve. 4,694,903, Cl. 166-250.000.

Rintekno Oy: *See*—
Juhola, Pentti, 4,694,658, Cl. 62-100.000.

Ripl, Wilhelm K.; and Verner, Bo L., to Atlas Copco Aktiebolag. Method for improving the phosphorus elimination capacity of a lake. 4,695,384, Cl. 210-602.000.

Ritsko, Joseph E.; Houck, David L.; and Acla, Howard L. R., to GTE Products Corporation. Yttrium oxide stabilized zirconium oxide. 4,695,439, Cl. 423-263.000.

Ritterbex, Horst: *See*—
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.

Ritzman, Ira G.; and Wright, Joseph W., to RCA Corporation. Imaging system having an improved electrostatic yoke and method of making same. 4,695,775, Cl. 315-410.000.

Robbins, Kenneth W.: *See*—
Ross, Gerald F.; and Robbins, Kenneth W., 4,695,752, Cl. 307-518.000.

Robbins, Robert L.: *See*—
Maddux, Forrest E., Jr.; Eagle, Paul A.; and Robbins, Robert L., 4,694,638, Cl. 53-459.000.

Robbins, William L., to United States of America, Navy. Film chip capacitor. 4,695,921, Cl. 361-308.000.

Robershaw Controls Company: *See*—
McGeorge, Gram J., 4,695,711, Cl. 219-506.000.

Robert Bosch GmbH: *See*—
Flohrs, Peter; and Michel, Hartmut, 4,695,867, Cl. 357-46.000.
Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, 4,694,814, Cl. 123-644.000.
Peters, Klaus-Jurgen, 4,694,808, Cl. 123-453.000.
Schauwecker, Friedrich; and Weber, Walter, 4,695,928, Cl. 362-61.000.
Schleupen, Richard; Mayer, Ulrich; Bauer, Bernhard; and Langner, Arnd M., 4,696,002, Cl. 371-12.000.

Roberts, Maurice P., to TRW Inc. Steering apparatus. 4,694,925, Cl. 180-79.100.

Robertshaw Controls Company: *See*—
Everett, Charles J.; and Ochsner, Rolf H., 4,695,829, Cl. 340-586.000.

Robinson Brothers Limited: *See*—
Stevenson, Arthur, 4,695,609, Cl. 525-352.000.

Robinson, Leonard W., to Fibre Converters, Inc. Thermoformable composite articles. 4,695,501, Cl. 428-159.000.

Robinson, William C.: *See*—
Mahapatra, Amaresh; McMahon, Donald H.; Robinson, William C.; and Sanford, Norman A., 4,695,121, Cl. 350-96.120.

Robishaw, Alces P.; and Robishaw, Paul A. Locks for construction components. 4,695,184, Cl. 403-410.000.

Robishaw, Paul A.: *See*—
Robishaw, Alces P.; and Robishaw, Paul A., 4,695,184, Cl. 403-410.000.

Robotest Oy: *See*—
Kuusi, Juhani, 4,696,023, Cl. 378-46.000.

Roche, Gregory A. Apparatus for, and methods of, depositing a substance on a substrate. 4,694,777, Cl. 118-725.000.

Rockwell International Corporation: *See*—
Christe, Karl O., 4,695,296, Cl. 55-68.000.
Custode, Frank Z., 4,694,565, Cl. 437-34.000.
Hall, James R., 4,694,729, Cl. 89-8.000.
Hamermesh, Charles L.; Dynes, Paul J.; and Hogenson, Peter A., 4,695,619, Cl. 528-73.000.
Rozema, John G.; and Thompson, Kenneth A., 4,696,016, Cl. 375-20.000.

Roddeck, Werner F.: *See*—
Deutsch, Volker K.; and Roddeck, Werner F., 4,695,797, Cl. 324-230.000.

Rodiac Intercessor Ltd.: *See*—
Meijer, Johan B. A., 4,694,952, Cl. 198-499.000.

Rodrigues, Julio: *See*—
Strauss, Richard F.; Herb, Phillip; Noorily, Peter; and Rodrigues, Julio, 4,695,679, Cl. 174-117.0FF.

Rodriguez, Rodolfo R.: *See*—
Wardlaw, Stephen C.; Levine, Robert A.; Rodriguez, Rodolfo R.; and Loken, Michael R., 4,695,553, Cl. 436-177.000.

Roesch, Egon: *See*—
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.

Roffinella, Daniele: *See*—
Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, 4,696,001, Cl. 370-88.000.

Rogers, Edward A.: *See*—
Comer, Robert C.; Hampel, Wilbur J.; and Rogers, Edward A., 4,694,528, Cl. 15-330.000.

Rogers, Walter C., Jr., to Parma Corporation. Self-inflatable air mattress in a foldable support. 4,694,515, Cl. 5-13.000.

Rogers, William H., to Safariland Ltd., Inc. Handgun holster. 4,694,980, Cl. 224-243.000.

Rohde, Guenter: *See—*
Grossmann, Udo; Holzinger, Dieter; and Rohde, Guenter, 4,695,004, Cl. 242-56.00R.

Rohm, Gunter H. Chip-shedding hammer-drill chuck. 4,695,066, Cl. 279-62.000.

Rohulich, John J.: *See—*
Seevers, Daniel B.; and Rohulich, John J., 4,694,725, Cl. 84-1.270.

Rokkaku, Tadashi: *See—*
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Roland Kabushiki Kaisha: *See—*
Kikumoto, Tadao; and Murakami, Isato, 4,694,724, Cl. 84-1.030.

Roland, Leonard A.: *See—*
Grellmann, Heinz E.; and Roland, Leonard A., 4,695,811, Cl. 333-105.000.

Romine, Charles F.: *See—*
Meisner, Edward O.; and Romine, Charles F., 4,695,061, Cl. 277-27.000.

Rommerskirchen, Hans J.: *See—*
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.

Rorer, Morris P., to Du Pont de Nemours, E. I., and Company. Benzofuran and benzothiophene sulfonamides. 4,695,310, Cl. 71-90.000.

Rorer, Morris P., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,695,311, Cl. 71-92.000.

Roschman, Peter: *See—*
Buikman, Dirk; Helzel, Thomas; and Roschman, Peter, 4,694,836, Cl. 128-653.000.

Rose, K. Daniel; Yarbrough, Charles; and Strachan, Alan F., to Warmwipes, Inc. Warming device for disposable towel dispenser. 4,694,973, Cl. 221-46.000.

Rose, Robert J.; and Trimble, Russell L. Modular medication dispensing system and apparatus utilizing portable memory device. 4,695,954, Cl. 364-413.000.

Rosenthal, James M., to ACR Electronics. Ear microphone. 4,696,045, Cl. 381-114.000.

Rosink, Albert, deceased (by Rosink, Lieselotte, heiress), to Albert Rosink Maschinenbau. Can coiler. 4,694,540, Cl. 19-159.00R.

Rosink, Lieselotte, heiress: *See—*
Rosink, Albert, deceased, 4,694,540, Cl. 19-159.00R.

Ross, Gerald F.; and Robbins, Kenneth W., to Sperry Corporation. Narrow range gate baseband receiver. 4,695,752, Cl. 307-518.000.

Rosse, Gabriel: *See—*
Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, 4,695,432, Cl. 422-98.000.

Rossmann, Christian; Fluechter, Horst; Schreiber, Gerald; and Wichelhaus, Winfried, to Henkel Kommanditgesellschaft auf Aktien. Two-component alkaline cleaning compositions and methods of preparing and using same. 4,695,396, Cl. 252-135.000.

Rothfuss, Hans: *See—*
Winkelmann, Manfred; Rothfuss, Hans; Muschner, Udo; and Schmitt, Karl H., 4,695,043, Cl. 266-265.000.

Rotoflow Corporation: *See—*
Swearingen, Judson S., 4,695,221, Cl. 415-36.000.

Rott, Horst, to Mannesmann Rexroth GmbH. Valve for attachment to an actuating means. 4,694,862, Cl. 137-625.500.

Roulet-Dubonnet, Jean-Pierre: *See—*
Terracol, Claude; and Roulet-Dubonnet, Jean-Pierre, 4,695,913, Cl. 361-13.000.

Routson, Gregory S., to Lear Siegler, Inc. Circumferentially oriented flexure suspension. 4,694,703, Cl. 74-5.00F.

Rowan, Hugh H.: *See—*
Cordova, Colleen W.; and Rowan, Hugh H., 4,695,509, Cl. 428-267.000.

Roy, Gilles, to Ecole Polytechnique. Method and system for measuring the amplitude and phase angle of harmonics in a periodic signal. 4,695,792, Cl. 324-83.00D.

Rozema, John G.; and Thompson, Kenneth A., to Rockwell International Corporation. Digital clock recovery circuit for return to zero data. 4,696,016, Cl. 375-20.000.

Rudelle, Marie-Irene, to U.S. Philips Corporation. Microwave sweep frequency oscillator. 4,695,809, Cl. 331-117.00D.

Ruderian, Max J. Nasal inhalation system. 4,694,824, Cl. 128-203.220.

Rudolph, John M.; and Wohlhieter, George M., to AMISTAR Corporation. Surface mounted component transport mechanism. 4,694,570, Cl. 29-740.000.

Rudy, Willi; and Lange, Gerhard, to Wafios Maschinenfabrik GmbH & Co. KG. Method and apparatus for producing oval chain links from round wire. 4,694,644, Cl. 59-27.000.

Rue, Robert H., to Harvey Hubbell Incorporated. HID lamp ballast tester. 4,695,803, Cl. 324-403.000.

Rueckl, Roger L., to United States Steel Corporation. High strength coke-oven mortar. 4,695,323, Cl. 106-85.000.

Ruether, John A.: *See—*
Warzinski, Robert P.; and Ruether, John A., 4,695,372, Cl. 208-311.000.

Rush, John L. Interlocking landscape planking. 4,695,502, Cl. 428-192.000.

Russell, Michael K.; Wesenberg, Donald L.; and Leaney, Peter A., to NL Industries, Inc. Assemblies for supporting electrical circuit boards within tubes and method of using same. 4,694,555, Cl. 29-451.000.

Russo, James T.: *See—*
Levine, Michael R.; Russo, James T.; Cairo, Anthony C.; and Rigotti, Victor H., 4,695,942, Cl. 364-188.000.

Ruth, Dale G.; and Yuhas, Robert J. Wire tensioning system. 4,695,677, Cl. 194-45.0TD.

Ryan, James W.; and Chung, Alfred, to University of Miami. Antihypertensive agents. 4,695,577, Cl. 514-362.000.

Ryan, James W.; and Chung, Alfred, to University of Miami. Inhibitors of angiotensin converting enzyme. 4,695,582, Cl. 514-423.000.

Ryan, John O., to Macrovision. Method and apparatus for removing pseudo-sync and/or agc pulses from a video signal. 4,695,901, Cl. 380-5.000.

S.c.a.i.m.e.: *See—*
Mairot, Guy, 4,694,922, Cl. 177-178.000.

S&C Electric Company: *See—*
O'Leary, Raymond P., 4,695,918, Cl. 361-58.000.

Sable, Frank R.: *See—*
Barton, James C.; Hefner, Robert E.; Reid, Paul A.; and Sable, Frank R., 4,694,928, Cl. 180-268.000.

Sachs, Frederick; Auerbach, Anthony; McGarrigle, Richard G.; and Neil, James E., to Research Foundation of State University of New York, The. Method and apparatus for heating and controlling the temperature of ultra small volumes. 4,695,709, Cl. 219-494.000.

Sachtler, J. W. A.: *See—*
Chao, Tai-Hsiang; and Sachtler, J. W. A., 4,695,666, Cl. 585-481.000.

Sado, Ichiro, to Canon Kabushiki Kaisha. Input device. 4,696,048, Cl. 382-13.000.

Saeki, Kazumi: *See—*
Magami, Masato; Saeki, Kazumi; Miura, Takanori; and Inoue, Takeshi, 4,695,649, Cl. 560-86.000.

Safariland Ltd., Inc.: *See—*
Rogers, William H., 4,694,980, Cl. 224-243.000.

Sage, Ian C.: *See—*
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

Sagisawa, Shinobu; Takahama, Teizo; and Kobayashi, Mitsuo, to Fuji Electric Corporate Research and Developement Ltd. Pressure sense recognition control system. 4,695,963, Cl. 364-513.000.

Sailer, Heinrich: *See—*
Schollmeier, Gero H. J.; and Sailer, Heinrich, 4,695,998, Cl. 370-32.100.

Saingier, Jean; and Joly, Jean-Pierre A., to Dollfus-Meig & Cie. N-oxiranemethane N,N,N-trialkylammonium compounds. 4,695,641, Cl. 549-552.000.

St. Clair, Terry L.: *See—*
Egli, Annmarie O.; and St. Clair, Terry L., 4,695,610, Cl. 525-426.000.

Saito, Atsushi: *See—*
Ichihashi, Hiroo; Ozawa, Masakazu; Ebinuma, Ryuichi; and Saito, Atsushi, 4,695,855, Cl. 346-145.000.

Saito, Kikuji: *See—*
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Saito, Masahiko: *See—*
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.

Saito, Morikuni: *See—*
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.

Saito, Morinobu: *See—*
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Saito, Shuichi: *See—*
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.

Saito, Syuichiro; and Okino, Tadashi, to Canon Kabushiki Kaisha. Exposure control apparatus. 4,695,894, Cl. 358-228.000.

Saito, Yasuziro, to Jidosha Denki Kogyo Kabushiki Kaisha. Link coupling device. 4,695,180, Cl. 403-114.000.

Saji, Yoshiaki: *See—*
Goto, Giichi; and Saji, Yoshiaki, 4,695,572, Cl. 514-278.000.

Sakae, Tatsuya: *See—*
Kodama, Masahiro; Sakae, Tatsuya; and Urano, Yoshio, 4,695,967, Cl. 364-521.000.

Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, to Hitachi Zosen Corporation. Apparatus for continuous casting of thin metallic plate. 4,694,885, Cl. 164-416.000.

Sakaguchi, Haruo, to Hitachi Zosen Corporation. Horizontal continuous casting apparatus. 4,694,886, Cl. 164-416.000.

Sakaguchi, Kanji: *See—*
Hayashi, Souichi; Miyake, Johji; Koyama, Mototsugu; and Sakaguchi, Kanji, 4,695,329, Cl. 148-3.000.

Sakai, Tokuji: *See—*
Sumitani, Koji; Sakai, Tokuji; Yamasaki, Yasuo; and Onodera, Tamio, 4,695,667, Cl. 585-481.000.

Sakaki, Naoaki: *See—*
Nagano, Masahiko; and Sakaki, Naoaki, 4,695,899, Cl. 358-310.000.

Sakamoto, Atsushi: *See*—
Iwahara, Makoto; Miyaji, Naotaka; and Sakamoto, Atsushi, 4,696,043, Cl. 381-92.000.

Sakamoto, Keiji: *See*—
Kurakake, Mitsuo; Sakamoto, Keiji; and Toyosawa, Yukio, 4,695,780, Cl. 318-561.000.

Sakamoto, Tsutomu, to Kansai Environmental Development Co., Ltd. Machine for cutting solid bodies. 4,694,716, Cl. 83-112.000.

Sakata, Tomio, to Tokyo Shibaura Denki Kabushiki Kaisha. Apparatus for detecting an utterance boundary. 4,696,041, Cl. 381-46.000.

Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, to Wako Pure Chemical Industries, Ltd. Process for quantitative determination of substrate treated with oxidase. 4,695,539, Cl. 435-10.000.

Sakemoto, Akito: *See*—
Maruyama, Hiroshi; Mizushima, Kunio; Sakemoto, Akito; and Umebayashi, Nobuhiro, 4,695,910, Cl. 360-133.000.

Sakiyama, Keizo: *See*—
Mimoto, Toshio; and Sakiyama, Keizo, 4,695,745, Cl. 307-297.000.

Sakuma, Nobuo, to Ricoh Company, Ltd. *Fθ* single lens. 4,695,132, Cl. 350-409.000.

Sakura, Shigeyuki: *See*—
Takezawa, Hatsuo; Donuma, Kenichi; Katagiri, Shuhei; and Sakura, Shigeyuki, 4,695,858, Cl. 357-19.000.

Sakurai, Takao: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, 4,695,651, Cl. 560-141.000.

Sakurama, Teruo: *See*—
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.

Salminen, Ari, to Tamfelt Oy Ab. Improvements relating to belts of inter-woven spiral wires. 4,695,015, Cl. 245-6.000.

Salomon S.A.: *See*—
Petrini, Roland; and Morell, Joseph, 4,694,593, Cl. 36-120.000.

Samec, Robert C.: *See*—
Rao, T. V.; and Samec, Robert C., 4,695,519, Cl. 429-52.000.

Samhaber, Wolfgang; and Renn, Werner, to Proton AG. Sampling apparatus for a biological reactor. 4,695,551, Cl. 435-292.000.

Samsung Electronics Co., Ltd.: *See*—
Kim, Jin H., 4,695,906, Cl. 360-85.000.

Sandbach, Rex H.; and Poole, Alan, to Co-Ordinate Technology Ltd. Step and repeat apparatus. 4,694,776, Cl. 118-500.000.

Sanden Corporation: *See*—
Koitabashi, Takatoshi, 4,694,945, Cl. 192-84.00C.

Sander, Theo: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Sanders, David E.: *See*—
Masheff, Michael S.; and Sanders, David E., 4,696,017, Cl. 375-60.000.

Sanders, Robert N.: *See*—
Laurent, Sebastian M.; and Sanders, Robert N., 4,695,461, Cl. 424-154.000.

Sandoz Ltd.: *See*—
Avar, Lajos, 4,695,600, Cl. 524-103.000.

Sandt, Henry J., Jr.: *See*—
Van Iperen, Willem H. P.; Sandt, Henry J., Jr.; and Aronson, Eric G., 4,695,211, Cl. 410-77.000.

Sanford, Norman A.: *See*—
Mahapatra, Amaresh; McMahon, Donald H.; Robinson, William C.; and Sanford, Norman A., 4,695,121, Cl. 350-96.120.

Sangamo Weston, Inc.: *See*—
Randall, Bruce E., 4,695,742, Cl. 307-271.000.

Sanjo Machine Works, Ltd.: *See*—
Muto, Yoshiyuki; Etani, Tadao; Aida, Satoru; and Kato, Shinya, 4,695,007, Cl. 242-58.400.

Sankey Vending Limited: *See*—
Daintrey, Joseph W.; and Thomson, Peter, 4,694,739, Cl. 99-289.00R.

Sankyo Company Limited: *See*—
Terahara, Akira; and Tanaka, Minoru, 4,695,587, Cl. 514-510.000.

Sano, Shinichi: *See*—
Takeuchi, Yasuhito; Hirota, Yuichi; Sano, Shinichi; and Ishiguro, Shinichi, 4,694,680, Cl. 73-1.0DV.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Sugimoto, Makoto, 4,694,929, Cl. 180-311.000.
Suzuki, Hideo; and Nozue, Kazunobu, 4,695,260, Cl. 440-61.000.

Santa Barbara Research Center: *See*—
Osgood, Roderic L., 4,695,794, Cl. 324-158.00R.

Santa Fe International Corporation: *See*—
Bhalaik, Arun; Braddick, Peter W.; Brittin, Darryl S.; and Johnson, Gerald L., 4,695,194, Cl. 405-207.000.

Santel, Hans-Joachim: *See*—
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.

Sanyo Electric Co., Ltd.: *See*—
Kishi, Hiroyasu, 4,695,875, Cl. 358-28.000.

Sapitowicz, Thomas P., to General Instrument Corp. Horizontally or vertically orientable compact ticket processor. 4,695,171, Cl. 400-70.000.

Sapper, Rainer, to Linde Aktiengesellschaft. Separation of CO_2 from a gaseous mixture. 4,695,304, Cl. 62-27.000.

Sargeant, Paul R.: *See*—
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.

Sargent Oil Well Equipment Company of Dover Resources, Incorporated: *See*—
Yates, Kenneth H., 4,695,779, Cl. 318-484.000.

Sarrazin, Yvon; and Smolens, Harry D., to Asten Group, Inc. Papermakers flat woven fabric. 4,695,498, Cl. 428-121.000.

Sashin, Donald; and Sternglass, Ernest J., to University of Pittsburgh. Stereoscopic radiography apparatus and method. 4,696,022, Cl. 378-41.000.

Sasson, Steven J., to Eastman Kodak Company. Apparatus for processing a time-division multiplex video signal having signal durations divisible by the same number. 4,695,874, Cl. 358-21.00R.

Sato, Kazuteru: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.

Sato, Kozo: *See*—
Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, 4,695,525, Cl. 430-151.000.

Sato, Michitaka: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Sato, Shinichi: *See*—
Inoue, Yoshio; Arai, Masatoshi; Sato, Shinichi; and Yokoo, Koji, 4,695,617, Cl. 528-32.000.

Sato, Yasuhisa: *See*—
Nakayama, Hiroki; Sato, Yasuhisa; and Yamada, Yasuyuki, 4,695,134, Cl. 350-432.000.

Satoh, Hidetaka; Kurosawa, Hideyuki; Kamijoh, Yoshiaki; and Jyumonji, Hiromichi, to Nippon Telegraph and Telephone Corporation. Protector circuit. 4,695,916, Cl. 361-56.000.

Satoh, Hiroshi: *See*—
Miura, Hirohisa; Satoh, Hiroshi; Natsume, Toshio; and Katagiri, Hidenori, 4,695,319, Cl. 75-63.000.

Satoh, Isao: *See*—
Takagi, Yuuji; Satoh, Isao; and Sugimura, Tatsuo, 4,695,993, Cl. 369-54.000.

Satoh, Yutaka: *See*—
Ishii, Kenjiro; Satoh, Yutaka; Fukumoto, Fumio; Otsuki, Hajime; Kokura, Yasuhide; and Saito, Shuichi, 4,695,155, Cl. 355-45.000.

Sauer, Gerhard; and Haffer, Gregor, to Schering Aktiengesellschaft. Process for the production of 2,3-dihydroergolines. 4,695,635, Cl. 546-69.000.

Sawamura, Mitsuharu; Honguu, Kazuoki; and Kikuchi, Kazuhiko, to Canon Kabushiki Kaisha. Opto-magnetic recording medium. 4,695,510, Cl. 428-336.000.

Sawaoka, Akira: *See*—
Akashi, Tamotsu; and Sawaoka, Akira, 4,695,321, Cl. 75-243.000.

Scardovi, Alessandro, to Ing. C. Olivetti & C., S.p.A. Ink jet print head. 4,695,852, Cl. 346-140.00R.

Schachar, Ronald A. Method and apparatus for determining surface shapes using reflected laser light. 4,695,163, Cl. 356-369.000.

Schallner, Otto: *See*—
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.

Schauwecker, Friedrich; and Weber, Walter, to Robert Bosch GmbH. Frame for headlights of motor vehicles. 4,695,928, Cl. 362-61.000.

Schembri, John J., to Pacific Bell. Optical fiber bandwidth limiting method. 4,696,063, Cl. 455-612.000.

Schering Aktiengesellschaft: *See*—
Sauer, Gerhard; and Haffer, Gregor, 4,695,635, Cl. 546-69.000.

Schering Corporation: *See*—
Hanna, Gayda; and Vadino, Winston A., 4,695,591, Cl. 514-781.000.
Rane, Dinanath F.; Desai, Jagdish A.; and Pike, Russell E., 4,695,579, Cl. 514-397.000.

Scheufler, Bernd: *See*—
Dreyer, Heinz; Scheufler, Bernd; Wiemeyer, Benno; and Luhrmann, Johannes, 4,694,759, Cl. 111-85.000.

Schiffers, Theo: *See*—
Grafen, Karl; and Schiffers, Theo, 4,694,526, Cl. 15-306.00A.

Schiller, Michael, to Fingermatrix, Inc. Matcher. 4,696,046, Cl. 382-5.000.

Schitthof, Hiltrud, to Jos. Schneider Optische Werke Kreuznach GmbH & Co. KG. Projection objective assembly. 4,695,136, Cl. 350-472.000.

Schleupen, Richard; Mayer, Ulrich; Bauer, Bernhard; and Langner, Arnd M., to Robert Bosch GmbH. Resetting circuit for microprocessors. 4,696,002, Cl. 371-12.000.

Schloesser, Ewald: *See*—
Forte, Mark R.; Khowaylo, Alex; and Schloesser, Ewald, 4,695,282, Cl. 623-22.000.

Schmid, Hans-Dieter: *See*—
Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, 4,694,814, Cl. 123-644.000.

Schmid, Karl H.: *See*—
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.

Schmidli, Pierre: *See—*
Meister, Pierre-Andre ; Schmidli, Pierre; and Soltermann, Bertrand, 4,695,168, Cl. 368-31.000.

Schmidt, Peter: *See—*
Jacoby, Hans-Dieter; and Schmidt, Peter, 4,695,215, Cl. 414-225.000.

Schmidt, Robert R.: *See—*
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.

Schmidt, Wolfgang, to Emuge-Werk Richard Glimpel Fabrik fuer Praezisionswerkzeuge (vormals Moschkau & Glimpel). Overload clutch particularly for thread-cutting chucks or the like. 4,694,944, Cl. 192-56.00R.

Schmidt, Wolfgang: *See—*
Piorr, Robert; Panthel, Guenter; Schmid, Karl H.; Colignon, Dietmar; Rommerskirchen, Hans J.; Schmidt, Wolfgang; and Ritterbex, Horst, 4,695,409, Cl. 260-400.000.

Schmitt, Karl H.: *See—*
Winkelmann, Manfred; Rothfuss, Hans; Muschner, Udo; and Schmitt, Karl H., 4,695,043, Cl. 266-265.000.

Schmitt, Thomas J., to Emerson Electric Co. Structural support shoe and method of manufacturing the same. 4,694,932, Cl. 182-109.000.

Schmitt, Urban; Deeg, Rolf; and Ziegenhorn, Joachim, to Boehringer Mannheim GmbH. Process and reagent for the determination of the hemoglobin-haptoglobin complex in the presence of free hemoglobin. 4,695,552, Cl. 436-66.000.

Schmitt, Wolfgang; and Forch, Hans, to Carl Freudenberg, Firma. Radial shaft seal ring with backfeed ribs and damming ribs. 4,695,063, Cl. 277-134.000.

Schneider, Jakob: *See—*
Dreckmann, Karl; Schneider, Jakob; and Theuner, Hans-Werner, 4,695,346, Cl. 156-361.000.

Schneider, Michael: *See—*
Gademann, Lothar; Hirt, Adam; Michel, Hartmut; Schmid, Hans-Dieter; and Schneider, Michael, 4,694,814, Cl. 123-644.000.

Schneider, Walter: *See—*
Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, 4,695,166, Cl. 366-160.000.

Schnell, Raimund. Fastening arrangement for a minimum of three struts along the spatial axes. 4,695,179, Cl. 403-24.000.

Schnur, Rodney C., to Pfizer Inc. Hypoglycemic 5-substituted oxazolidine-2,4-diones. 4,695,634, Cl. 544-300.000.

Schoen, Uwe: *See—*
Heinemann, Henning; Kehrbach, Wolfgang; Schoen, Uwe; Buschmann, Gerd; and Kuhl, Ulrich, 4,695,566, Cl. 514-234.000.

Schoenbaum, Gary L.; Latanzi, Lewis A.; Hedrick, Stephen L.; and Johnson, Harold V., to Benchmark Industries Incorporated. Solder process inspection diffuser assembly. 4,695,157, Cl. 356-237.000.

Schofield, William S., to Motorola, Inc. Automatic leveling circuit for a composite video signal. 4,695,886, Cl. 358-176.000.

Schollmeier, Gero H. J.; and Sailer, Heinrich, to Siemens Aktiengesellschaft. Method and circuit arrangement for the compensation of echo signals. 4,695,998, Cl. 370-32.100.

Schonbach, Bernard H., to Fuller Company. Apparatus for exerting a downward force on a grinding roller. 4,694,997, Cl. 241-117.000.

Schophoff, Friedrich: *See—*
Reh, Kuno; and Schophoff, Friedrich, 4,695,656, Cl. 568-587.000.

Schreder, Felix, to E.G.O. Elektro Gerate Blanc u. Fischer. Electric cooker. 4,695,708, Cl. 219-486.000.

Schreiber, Gerald: *See—*
Rossmann, Christian; Fluechter, Horst; Schreiber, Gerald; and Wichelhaus, Winfried, 4,695,396, Cl. 252-135.000.

Schroter, Gottfried: *See—*
Slemmer, Janos; and Schroter, Gottfried, 4,694,825, Cl. 128-205.240.

Schuermann, Rodger W.: *See—*
Brown, Gregory D.; Clark, Darrel E.; and Schuermann, Rodger W., 4,694,692, Cl. 73-155.000.

Schuetz, Hans-Josef, to Ing. Erich Pfeiffer GmbH & Co. KG. Discharge apparatus for flowable media. 4,694,976, Cl. 222-189.000.

Schulte, Klaus; Nadolski, Klaus; Ersfeld, Heinrich; Ebeling, Wilfried; Boden, Heinrich; and Schneider, Walter, to Bayer Aktiengesellschaft. Piston metering device for the production of plastic material from at least two flowable reaction components. 4,695,166, Cl. 366-160.000.

Schultze, Manfred: *See—*
Premel, Ulrich; Dorling, Rolf; and Schultze, Manfred, 4,694,782, Cl. 122-7.00R.

Schulze, Harry O.; and Karam, Ronald E., to GTE Products Corporation. Gray body colored zinc sulfide activated with copper. 4,695,478, Cl. 427-71.000.

Schumacher, Ingo: *See—*
Lambertz, Johannes; and Schumacher, Ingo, 4,695,789, Cl. 324-61.00P.

Schuman, Deborah Pauline: *See—*
Serap, Earl; and Serap, Deborah, 4,695,903, Cl. 358-335.000.

Schundehutte, Karl H.: *See—*
Kalk, Walter; Schundehutte, Karl H.; and Soll, Manfred, 4,695,632, Cl. 544-194.000.

Schuster, Werner: *See—*
Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, 4,695,397, Cl. 252-182.000.

Schutz, Gunter: *See—*
Caspar, Hans-Peter; and Schutz, Gunter, 4,695,223, Cl. 415-90.000.

Schwabe, Peter; and Voigt, Reiner, to Bayer Aktiengesellschaft. Dust-free alginate impression materials. 4,695,322, Cl. 106-35.000.

Schwaiger, Max: *See—*
Rieder, Heinz; and Schwaiger, Max, 4,695,720, Cl. 250-231.0SE.

Schwalb, Horst, to Dynaflair Corporation Canada Inc. Door lock structure. 4,694,669, Cl. 70-100.000.

Schwarte, Jurgen: *See—*
Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, 4,695,444, Cl. 423-569.000.

Schwartz, David C.: *See—*
Cantor, Charles R.; and Schwartz, David C., 4,695,548, Cl. 435-179.000.

Schwartz, Morton K.: *See—*
Fleisher, Martin; Bradlow, H. Leon; and Schwartz, Morton K., 4,695,471, Cl. 436-64.000.

Schwartz, William C., to Burlington Industries, Inc. Low toxic ceiling board facing. 4,695,507, Cl. 428-228.000.

Schwarz, Ulf: *See—*
Mieth, Guenther; and Schwarz, Ulf, 4,695,785, Cl. 323-222.000.

Schweickardt, Karl, to Wide-Lite International. Logarithmic-to-linear photocontrol apparatus for a lighting system. 4,695,769, Cl. 315-158.000.

Schweighardt, Frank K.: *See—*
Garg, Diwakar; Givens, Edwin N.; and Schweighardt, Frank K., 4,695,369, Cl. 208-112.000.

Scinta, James, to Phillips Petroleum Company. Apparatus and method for feeding solid materials to a high pressure vessel. 4,695,214, Cl. 414-221.000.

Scriba, John M., Jr.: *See—*
Sorenson, Robert E.; and Scriba, John M., Jr., 4,694,966, Cl. 211-88.000.

Scriptel Corporation: *See—*
Kable, Robert G., 4,695,680, Cl. 178-19.000.

Scrivo, Jerry V.; and Breuker, Gordon W., to Ex-Cell-O Corporation. Valved mix-head for rim process. 4,695,433, Cl. 422-112.000.

Sea-Land Corporation, Inc.: *See—*
Van Iperen, Willem H. P.; Sandt, Henry J., Jr.; and Aronson, Eric G., 4,695,211, Cl. 410-77.000.

Seatronics, Inc.: *See—*
Grady, Mark P., 4,695,361, Cl. 204-415.000.

SEB S.A.: *See—*
Daloz, Joanny, 4,694,740, Cl. 99-323.300.

Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, to Tecnomare S.p.A. Slender flexible marina structure for hydrocarbon production and ship mooring in deep seas. 4,695,193, Cl. 405-204.000.

Secrest, Bruce G.: *See—*
Doddington, George R.; and Secrest, Bruce G., 4,696,038, Cl. 381-38.000.

Seddon, Duncan, to Broken Hill Proprietary Co., Ltd., The; and Commonwealth Scientific and Industrial Research Organisation. Production of gasoline. 4,695,670, Cl. 585-533.000.

Seevers, Daniel B.; and Rohulich, John J., to NCR Corporation. Sound generating system for a keyboard. 4,694,725, Cl. 84-1.270.

Seidel, Albert; and Malburg, Werner, to Messerschmitt-Bolkow-Blohm GmbH. Controllable helium-II phase separator. 4,694,655, Cl. 62-51.000.

Seiko Instruments & Electronics Ltd.: *See—*
Watanabe, Fumio; Komaki, Shojiro; Miyamoto, Masao; and Ito, Takao, 4,695,724, Cl. 250-292.000.

Seino, Masanori, to Shin-Etsu Chemical Co., Ltd. Organopolysiloxane composition for fire-resistant foamed silicone rubber. 4,695,597, Cl. 521-154.000.

Seltzer, Charles J. Massage footwear. 4,694,831, Cl. 128-582.000.

Seng, Florin; and Bremen, Josef, to Bayer Aktiengesellschaft. Process for the preparation of β-aminoethyl ketones. 4,695,652, Cl. 564-343.000.

Sengewald, Karl-Heinz. Package formed as bag to be carried. 4,696,050, Cl. 383-10.000.

Sengul, M. Marc; and Hinchman, Steven B., to Marathon Oil Company. Cyclic flooding of a naturally-fractured formation. 4,694,904, Cl. 166-252.000.

Senju Metal Industry Co., Ltd.: *See—*
Kawamata, Yuuji; Iino, Tomohiko; Suzuki, Ryoichi; and Haga, Noriyuki, 4,695,481, Cl. 427-96.000.

Senkingwerk GmbH: *See—*
Stoll, Karl-Heinz, 4,694,665, Cl. 68-27.000.

Senoplast Klepsch & Co.: *See—*
Klepsch, Wilhelm; and Plobst, Dietmar, 4,695,239, Cl. 425-194.000.

Serap, Deborah: *See—*
Serap, Earl; and Serap, Deborah, 4,695,903, Cl. 358-335.000.

Serap, Earl; and Serap, Deborah, to Schuman, Deborah Pauline. Audio video entertainment module. 4,695,903, Cl. 358-335.000.

Serizawa, Mitsuya: *See—*
Kawamoto, Yoshimichi; Furukawa, Yoshimi; Hamada, Tetsuro; and Serizawa, Mitsuya, 4,695,068, Cl. 280-91.000.

Servais, Raoul, to AGFA-Gevaert N.V. Method for the production of a combined live-action and animation motion picture film. 4,695,141, Cl. 352-50.000.

Servend International, Inc.: *See—*
Landers, Jerry L., 4,694,661, Cl. 62-344.000.

Seto, Kaoru: *See—*
Kimizuka, Junichi; Ushio, Yukihide; and Seto, Kaoru, 4,695,714, Cl. 250-205.000.

Seto, Youichi; Homma, Koichi; Komura, Fuminobu; and Ota, Hideo, to Hitachi, Ltd. Image correction processing method. 4,695,964, Cl. 364-518.000.

Setsuie, Takashi; Otani, Takeji; and Yoshida, Kanji, to Mitsubishi Rayon Co., Ltd. Method for producing acrylic fiber precursors. 4,695,415, Cl. 264-29.200.

Sewell, Glenwood H.: *See*—
Sewell, Rickey E.; and Sewell, Glenwood H., 4,694,695, Cl. 73-40.50R.

Sewell, Rickey E.; and Sewell, Glenwood H. Sewer pipe smoke blocking device. 4,694,695, Cl. 73-40.50R.

Seymour, Raymond K.: *See*—
Farrall, George A.; and Seymour, Raymond K., 4,695,688, Cl. 200-144.00B.

SGS Microelectronica S.p.A.: *See*—
Torelli, Guido; and De La Plaza, Alejandro, 4,696,035, Cl. 381-1.000.

SGS Microelettronica S.p.A.: *See*—
De La Plaza, Alejandro, 4,695,751, Cl. 307-490.000.

SGS Microelettronica SpA: *See*—
Mensiti, Pietro; and Marchio, Fabio, 4,695,786, Cl. 323-303.000.

Shacklette, Lawrence W.; Toth, James E.; and Elsenbaumer, Ronald L., to Allied Corporation. Conjugated polymer as substrate for the plating of alkali metal in a nonaqueous secondary battery. 4,695,521, Cl. 429-194.000.

Shaffer, Donald L. Locking means for fireplace screen. 4,694,819, Cl. 126-140.000.

Shape Inc.: *See*—
Gelardi, Anthony L., 4,694,557, Cl. 29-525.000.
Macleod, Robert B., Jr., 4,694,950, Cl. 198-465.300.

Sharma, Shri C.: *See*—
Yang, Robert K.; and Sharma, Shri C., 4,695,463, Cl. 424-440.000.

Sharp Kabushiki Kaisha: *See*—
Ishii, Hiroshi; Nakai, Syunzi; and Mizumoto, Yukihiro, 4,695,847, Cl. 346-1.100.
Mimoto, Toshio; and Sakiyama, Keizo, 4,695,745, Cl. 307-297.000.
Nakakura, Yukinori; and Kato, Nobuyuki, 4,695,479, Cl. 437-228.000.
Nakanishi, Yasuhiro; and Kawai, Shoichi, 4,695,976, Cl. 364-900.000.
Oda, Koichi; Hatta, Koichi; and Sumitani, Toshihiko, 4,695,983, Cl. 364-709.000.
Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, 4,695,514, Cl. 428-432.000.
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,695,966, Cl. 364-521.000.
Tsugei, Shinji; and Inoue, Tomohiro, 4,696,054, Cl. 455-89.000.

Shell Oil Company: *See*—
Dries, Hubertus W. A. A., 4,695,298, Cl. 55-223.000.

Shelton, Samuel V. Dual bed heat pump. 4,694,659, Cl. 62-106.000.

Shero, David J.; and Dadpey, Habib, to Westinghouse Electric Corp. Induction motor control apparatus and method. 4,695,783, Cl. 318-808.000.

Shibata, Akira, to Chugai Denki Kogyo K.K. Method of manufacturing internal oxidized Ag-SnO system alloy contact materials. 4,695,330, Cl. 148-6.300.

Shibata, Shoichi: *See*—
Komatsu, Teruaki; Kobayashi, Kiyoshi; Tatsu, Kunihiko; and Shibata, Shoichi, 4,695,065, Cl. 279-60.000.

Shichijo, Shunichi: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Shields, Stewart: *See*—
Straw, Alan; and Shields, Stewart, 4,695,451, Cl. 424-47.000.

Shigenari, Ryoichi: *See*—
Ogano, Takeo; Komatsuzaki, Takeshi; Shigenari, Ryoichi; and Uesugi, Naomoto, 4,694,942, Cl. 192-13.00A.

Shih, Stuart S.: *See*—
Graziani, Kenneth R.; Kyan, Chwan P.; Shih, Stuart S.; and Sowiak, Raymond M., 4,695,364, Cl. 208-59.000.

Shikaumi, Masao, to Canon Kabushiki Kaisha. Light measuring device. 4,695,149, Cl. 354-430.000.

Shimizu, Junichi: *See*—
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.

Shimizu Kensetsu Kabushiki Kaisha: *See*—
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.

Shimizu, Tetsuo; Tujimura, Kiyoharu; and Iwamoto, Michinori, to STEC Inc. Fluid control device. 4,695,034, Cl. 251-129.060.

Shimobuchi, Hideyuki: *See*—
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, 4,695,175, Cl. 400-196.100.

Shimoda, Kouji: *See*—
Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, 4,695,996, Cl. 369-77.100.

Shimomura, Setsuhiro: *See*—
Wataya, Seiji; Shimomura, Setsuhiro; and Nishimura, Yukinobu, 4,694,806, Cl. 123-494.000.

Shin-Etsu Chemical Co., Ltd.: *See*—
Inoue, Yoshio; Arai, Masatoshi; and Inoue, Takeo, 4,695,603, Cl. 524-723.000.
Inoue, Yoshio; Arai, Masatoshi; Sato, Shinichi; and Yokoo, Koji, 4,695,617, Cl. 528-32.000.
Seino, Masanori, 4,695,597, Cl. 521-154.000.

Shin Nihon Kohan Co., Ltd.: *See*—
Imaeda, Fumihiro; and Imaeda, Yoshio, 4,695,033, Cl. 249-189.000.

Shin Nisso Kako Co., Ltd.: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.

Shinagawa Refractories Co., Ltd.: *See*—
Mori, Masashi; Nonaka, Shingo; and Nagai, Seiji, 4,695,167, Cl. 366-181.000.

Shinn, Alan L., to Humphrey Instruments, Inc. Light pen having actuating accelerometer. 4,695,831, Cl. 340-707.000.

Shinno, Kouji; and Kuboki, Hitoshi, to Terumo Kabushiki Kaisha. Medical instrument. 4,695,276, Cl. 604-283.000.

Shinohara, Isao; and Yoshimoto, Itsuro, to Casio Computer Co., Ltd. Training type electronic musical instrument with keyboard indicators. 4,694,723, Cl. 84-1.030.

Shinooka, Kiyohide: *See*—
Uemura, Toshinobu; Shinooka, Kiyohide; and Kajiho, Tokuaki, 4,695,467, Cl. 424-502.000.

Shinozaki, Kaoru: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, to Victor Company of Japan, Ltd. Information signal recording disc recorded with an end signal for selectively preventing unwanted access to predetermined recorded information and disc reproducing apparatus therefor. 4,695,904, Cl. 358-342.000.

Shionogi & Co., Ltd.: *See*—
Aiba, Shuichi; and Imanaka, Tadayuki, 4,695,546, Cl. 435-172.300.
Hayase, Yoshio; Ohtsuka, Toshikazu; Ide, Kinya; and Takahashi, Toshio, 4,695,312, Cl. 71-92.000.

Shipley Company Inc.: *See*—
Dutkewych, Oleh B., 4,695,505, Cl. 428-209.000.

Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, to Dainichi-Nippon Cables, Ltd. Metal cored board and method for manufacturing same. 4,695,515, Cl. 428-458.000.

Shmulovich, Joseph: *See*—
Berkstresser, George W.; and Shmulovich, Joseph, 4,695,762, Cl. 313-474.000.

Shopsmith, Inc.: *See*—
Snyder, Steven A.; Smith, Jack; Flora, David D.; and Bartlett, Robert L., 4,694,713, Cl. 82-14.00R.

Shores, J. Wallace: *See*—
Howe, Steve R.; Warner, William B.; and Shores, J. Wallace, 4,694,781, Cl. 119-156.000.

Showa Precision Machinery Co., Ltd.: *See*—
Tanaka, Masami, 4,694,791, Cl. 123-179.00F.

Shubert, Wesley M.: *See*—
Astrom, Gordon L.; Weis, Ronald J.; and Shubert, Wesley M., 4,695,376, Cl. 210-122.000.

Shultz, Clifford G., to Detox International Corporation. Destruction of inorganic hazardous wastes. 4,695,447, Cl. 423-659.000.

Shure Brothers, Inc.: *See*—
Julstrom, Stephen D., 4,696,036, Cl. 381-22.000.

Shushereba, John J.: *See*—
Millham, Ernest H.; Moser, John J.; Shushereba, John J.; and Visco, Gary P., 4,696,005, Cl. 371-27.000.

Shutske, Gregory M.; and Pierrat, Frank A., to Hoechst-Roussel Pharmaceuticals Inc. 9-amino-1,2,3,4-tetrahydroacridin-1-ol and related compounds. 4,695,573, Cl. 514-290.000.

Shyang, Yang C. Multipurpose polisher. 4,694,614, Cl. 51-141.000.

Sibertin-Blanc, Jean-Baptiste; and Tellier, Yves, to Ecole Nationale Superieure de Creation Industrielle. Automatic tripping rescue system. 4,694,931, Cl. 182-3.000.

Sicor Societa Italiana Corticosteroidi S.p.A.: *See*—
Macdonald, Peter, 4,695,625, Cl. 540-63.000.

Sieberhagen, Gunter: *See*—
Knebel, Werner; and Sieberhagen, Gunter, 4,694,512, Cl. 4-192.000.

Siebler, Helmut, to Daimler-Benz Aktiengesellschaft. Motor-vehicle seat with backrest which can be swung forward out of a position of use. 4,695,094, Cl. 297-331.000.

Siecor Corporation: *See*—
Zimmerman, Bernd; and Chamberlain, John, 4,695,128, Cl. 350-96.230.

Siegel, Edgar, deceased: *See*—
Harnisch, Horst; and Siegel, Edgar, deceased, 4,695,405, Cl. 252-600.000.

Siegel Family Revocable Trust: *See*—
Siegel, Harold B., 4,694,996, Cl. 241-100.000.

Siegel, Harold B., to Siegel Family Revocable Trust. Multi cavity medication card crusher. 4,694,996, Cl. 241-100.000.

Siemens Aktiengesellschaft: *See*—
Bardl, Artur; and Lindner, Manfred, 4,695,804, Cl. 328-14.000.

Daalmans, Gabriel M., 4,694,567, Cl. 29-599.000.
Grosse, Joachim; Hess, Ruediger; Kuhl, Wilfried; and Mueller, Reiner, 4,695,687, Cl. 200-144.00B.
Jahnke, Andreas; Ries, Gunter; and Meier, Konrad, 4,694,868, Cl. 140-92.100.
Kloiber, Gerald, 4,695,818, Cl. 338-22.00R.
Lekholm, Anders, 4,694,830, Cl. 128-419.0PG.
Mieth, Guenther; and Schwarz, Ulf, 4,695,785, Cl. 323-222.000.
Reimann, Jurgen-Andreas; and Basilowski, Herbert, 4,695,960, Cl. 364-474.000.
Reimann, Udo, 4,695,971, Cl. 364-769.000.
Schollmeier, Gero H. J.; and Sailer, Heinrich, 4,695,998, Cl. 370-32.100.
Wendt, Peter, 4,695,919, Cl. 361-110.000.
Wolff, Pieter; and Wedler, Hartmut, 4,695,974, Cl. 364-900.000.

Siemens Corporate Research & Support, Inc.: *See—*
Levy, Allan, 4,696,032, Cl. 379-390.000.

Signal Security Technologies: *See—*
Wiedemer, John D., 4,696,034, Cl. 380-16.000.

Signetics Corporation: *See—*
Conner, George W.; Donald, Raymond G.; and Cline, Ronald L., 4,694,566, Cl. 437-48.000.

Sikich, Joseph P.; and Duncombe, Richard R., to Hewlett-Packard Company. Integrated circuit memory cell array using a segmented word line. 4,695,981, Cl. 365-227.000.

Silvestri, Frank, to Taylor, Greg. Drum skin tightening arrangement. 4,694,726, Cl. 84-413.000.

Simmel, Thomas L.; Crossley, David W.; and Morehouse, Mark N., to McDarren, Robert S.; Piels, Barry Y.; and Simmel, Thomas L. Battery-powered small-scale toy vehicle. 4,695,267, Cl. 446-462.000.

Simmons, Lacy. Apparatus for electrically stunning poultry. 4,694,534, Cl. 17-1.00E.

Simmons, Lacy. Post stunner for poultry. 4,694,535, Cl. 17-1.00E.

Simon, Charles R.: *See—*
Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., 4,694,899, Cl. 164-452.000.

Simonetta, Guerrieri: *See—*
Flosi, Corrado; Gobbi, Alberto; Maccioni, Roberto; and Simonetta, Guerrieri, 4,694,505, Cl. 2-2.000.

Simonette, Dallas W.; and Wiener, Bruce A., to Power-Flo Products Corporation. Fountain application handle with refill valve. 4,695,176, Cl. 401-144.000.

Sims, Edward H. Display receptacle for deciduous teeth. 4,694,956, Cl. 206-83.000.

Sinclair and Rush, Inc.: *See—*
Ventimiglia, Joseph J., 4,695,241, Cl. 425-275.000.

Sinclair, William J.; Kovats, Tibor F. I.; and Straus, Jozef, to Northern Telecom Limited. Hermetic optical attenuator. 4,695,125, Cl. 350-96.200.

Singer, Nathan: *See—*
Heck, Michael; and Singer, Nathan, 4,694,974, Cl. 221-263.000.

Single Buoy Moorings Inc.: *See—*
Poldervaart, Leendert; and Personnat, Jean C. M., 4,694,771, Cl. 114-230.000.

Sinko, Tibor, to Kisuzemi Innovacios Iroda. Self-propelled scaffold for buildings and rope tensioning means, as well as process for the construction and/or for the servicing of high buildings. 4,694,933, Cl. 182-128.000.

Skelnik, Debra: *See—*
Lindstrom, Richard L.; Doughman, Donald J.; and Skelnik, Debra, 4,695,536, Cl. 435-1.000.

Skinner, James L., to Atlantic Richfield Company. Apparatus for removal of wellbore particles. 4,694,901, Cl. 166-77.000.

Skipworth, Jerry D.: *See—*
Brickner, Louis C., Jr.; and Skipworth, Jerry D., 4,694,720, Cl. 83-471.300.

Skorka, Thomas: *See—*
Graf, Lothar; Maerte, Leo; and Skorka, Thomas, 4,694,977, Cl. 222-259.000.

Skyba, Helmut K. Elastic tie-down with rope adjustment means. 4,694,541, Cl. 24-301.000.

Slemmer, Janos; and Schroter, Gottfried, to Dragerwerk AG. Control for respirators. 4,694,825, Cl. 128-205.240.

Sloan-Kettering Institute for Cancer Research: *See—*
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.
Fleisher, Martin; Bradlow, H. Leon; and Schwartz, Morton K., 4,695,471, Cl. 436-64.000.

Sloma, Alan, to Bristol-Myers Company. Alpha Interferon GX-1. 4,695,543, Cl. 435-70.000.

Smaich, Mark: *See—*
D'Aleo, Michael J.; and Smaich, Mark, 4,695,820, Cl. 338-179.000.

Smayling, Michael C.: *See—*
Tuvell, James A.; and Smayling, Michael C., 4,695,979, Cl. 365-185.000.

Smirnov, Vladimir N.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Smith, Charles. Omni-directional display device. 4,695,929, Cl. 362-140.000.

Smith, David B.; and Miller, Randolph F., to Precor Incorporated. Exercise rowing machine. 4,695,050, Cl. 272-72.000.

Smith, Frank A.: *See—*
Baker, Robin M.; Sargeant, Paul R.; Papper, Ernest G.; Oberoi, Bhusan K.; Smith, Frank A.; and Rae, Malcolm C., 4,695,418, Cl. 264-151.000.

Smith, Glenn S., to Beebe International, Inc. Levelwind mechanism. 4,695,010, Cl. 242-158.00R.

Smith International, Inc.: *See—*
Best, Michael J. A.; Jones, Richard H.; Hynes, Joseph H.; Pond, Richard J.; and Gordon, Colin R., 4,695,190, Cl. 405-169.000.
Hall, David R., 4,694,918, Cl. 175-329.000.

Smith, Jack: *See—*
Snyder, Steven A.; Smith, Jack; Flora, David D.; and Bartlett, Robert L., 4,694,713, Cl. 82-14.00R.

Smith, Jay E.: *See—*
Spadaro, Peter R.; Smith, Jay E.; Speer, Elmer L.; and Cecconi, Arnold L., 4,695,299, Cl. 55-274.000.

Smith, Robert E., III, to National Coupling Company, Inc. Undersea hydraulic coupling and metal seal. 4,694,859, Cl. 137-614.040.

Smith, Terrance, to Ampex Corporation. Horizontal line data position and burst phase encoding apparatus and method. 4,695,873, Cl. 358-13.000.

Smith, William A.: *See—*
Beining, August H.; Dial, Larry A.; Smith, William A.; and Rieck, Gene W., 4,695,827, Cl. 340-365.00P.

Smolens, Harry D.: *See—*
Sarrazin, Yvon; and Smolens, Harry D., 4,695,498, Cl. 428-121.000.

Snitman, David: *See—*
Alton, Norman K.; Peters, Mary A.; Stabinsky, Yitzhak; and Snitman, David, 4,695,623, Cl. 530-351.000.

Snyder, Steven A.; Smith, Jack; Flora, David D.; and Bartlett, Robert L., to Shopsmith, Inc. Duplicating system for a lathe. 4,694,713, Cl. 82-14.00R.

Societa' Italtractor Meccanica Itm S.p.A.: *See—*
Crotti, Aldo, 4,695,102, Cl. 305-11.000.

Societe D'Electronique de La Region Pays de Loire: *See—*
Houchangnia, Zavoche, 4,695,844, Cl. 343-781.0CA.

Societe E. Lacrois - Tour Artifices: *See—*
Billard, Alain, 4,695,841, Cl. 342-8.000.

Societe Nationale Elf Aquitaine: *See—*
Belouet, Christian, 4,695,480, Cl. 437-225.000.

Soda, Yutaka: *See—*
Imakoshi, Shigeyoshi; Soda, Yutaka; and Suyama, Hideo, 4,695,908, Cl. 360-119.000.

Soga, Kazuo: *See—*
Suzuki, Shigeo; Doi, Yoshiharu; and Soga, Kazuo, 4,695,557, Cl. 502-103.000.

Sokol, Michael: *See—*
Coville, William E.; Grossman, Hyman; and Sokol, Michael, 4,695,430, Cl. 422-65.000.

Soll, Manfred: *See—*
Kalk, Walter; Schundehutte, Karl H.; and Soll, Manfred, 4,695,632, Cl. 544-194.000.

Sollenberger, Nelson R., to American Telephone and Telegraph Company AT&T Bell Laboratories. Equalizer with improved performance. 4,695,969, Cl. 364-724.000.

Soltermann, Bertrand: *See—*
Meister, Pierre-Andre ; Schmidli, Pierre; and Soltermann, Bertrand, 4,695,168, Cl. 368-31.000.

Solvay & Cie. (Societe Anonyme): *See—*
Dehennau, Claude; and Vandendael, Yannick, 4,695,506, Cl. 428-212.000.

Somers, Ralph M.: *See—*
Fulkerson, Emmet M.; Somers, Ralph M.; and Compton, Diana R., 4,695,721, Cl. 250-234.000.

Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, to BASF Aktiengesellschaft. Granular bleaching activator. 4,695,397, Cl. 252-182.000.

Sony Corporation: *See—*
Imakoshi, Shigeyoshi; Soda, Yutaka; and Suyama, Hideo, 4,695,908, Cl. 360-119.000.
Kato, Yoji; Watanabe, Seiichi; and Wada, Masaru, 4,695,862, Cl. 357-36.000.
Nakamizo, Hiromitsu; and Mochida, Takashi, 4,695,795, Cl. 324-208.000.

Sorenson, Robert E.; and Scriba, John M., Jr., to Knape & Vogt Manufacturing Co. Merchandising tray. 4,694,966, Cl. 211-88.000.

Sorge, Gernold: *See—*
Olbrich, Juergen; Biethan, Uwe; and Sorge, Gernold, 4,695,613, Cl. 525-533.000.

Southern California Edison: *See—*
Rabon, Joe D.; and Haro, Rudy, 4,695,737, Cl. 307-31.000.

Sowers, J. James. Method and apparatus for stepping a sailboat mast. 4,694,769, Cl. 114-90.000.

Sowiak, Raymond M.: *See—*
Graziani, Kenneth R.; Kyan, Chwan P.; Shih, Stuart S.; and Sowiak, Raymond M., 4,695,364, Cl. 208-59.000.

Spadaro, Peter R.; Smith, Jay E.; Speer, Elmer L.; and Cecconi, Arnold L., to United States of America, Energy. Method and apparatus for in-cell vacuuming of radiologically contaminated materials. 4,695,299, Cl. 55-274.000.

Sparkes, Laurie R.; and Baker, Joseph G., to JGB Industries, Inc. Remote control tilting system for raising and lowering radar and radio arch for boats. 4,694,773, Cl. 114-354.000.

Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, to Lockheed Corporation. Controlled expansion protruding-head rivet design. 4,695,213, Cl. 411-506.000.

Spease, Arthur L.: *See—*
Frankhouse, Thomas J.; and Spease, Arthur L., 4,694,705, Cl. 74-501.00R.

Specialty Products, Inc.: *See—*
Pettibone, Craig R.; and Berry, Jimmy D., 4,695,073, Cl. 280-690.000.

Spector, Donald. Aroma-generating unit. 4,695,434, Cl. 422-116.000.

Spector, Donald. Light-activated aroma generator. 4,695,435, Cl. 422-124.000.

Spectrol Electronics Corporation: *See—*
Vaughn, Eldon D., 4,694,657, Cl. 62-80.000.

Speer, Elmer L.: *See—*
Spadaro, Peter R.; Smith, Jay E.; Speer, Elmer L.; and Cecconi, Arnold L., 4,695,299, Cl. 55-274.000.

Spells, Sherwood; Warren, James R.; and Wieck, Ronald W., to Dow Corning Corporation. Sealant applicator. 4,695,185, Cl. 404-107.000.

Spenceley, Gene D.; and Henderson, Steven, to British Steel Corporation. Cooling of materials. 4,694,889, Cl. 164-488.000.

Sperry Corporation: *See—*
Labrum, Joseph H., 4,696,061, Cl. 455-609.000.
Ross, Gerald F.; and Robbins, Kenneth W., 4,695,752, Cl. 307-518.000.

Spinelli, Harry J., to Du Pont de Nemours, E. I., and Company. Group transfer processes for acrylic star polymers. 4,695,607, Cl. 525-272.000.

Sposini, Maurizio: *See—*
Gagliardi, Fabrizio; Lambarelli, Livio; Panarotto, Gianfranco; Roffinella, Daniele; and Sposini, Maurizio, 4,696,001, Cl. 370-88.000.

Spurgeon, Colleen J.: *See—*
Choy, Clement K.; Keen, Frederick I.; Garabedian, Aram; and Spurgeon, Colleen J., 4,695,394, Cl. 252-97.000.

Sriram, Subramanian: *See—*
Steinman, Lawrence; Waldor, Matthew K.; Sriram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., 4,695,459, Cl. 424-95.000.

SSI Medical Services, Inc.: *See—*
Paul, Patrick R. D.; and Price, James H., 4,694,520, Cl. 5-453.000.

SSI Technologies, Inc.: *See—*
Wendt, David L., 4,694,812, Cl. 123-571.000.

SSMC Inc.: *See—*
Adams, Kenneth D., 4,694,763, Cl. 112-184.000.

Staats, James E.; and Fitzmayer, Louis H., to General Electric Company. Triangular antenna array for microwave oven. 4,695,693, Cl. 219-10.55F.

Stabinsky, Yitzhak: *See—*
Alton, Norman K.; Peters, Mary A.; Stabinsky, Yitzhak; and Snitman, David, 4,695,623, Cl. 530-351.000.

Stachowicz, Michael J.: *See—*
Christian, Donald J.; and Stachowicz, Michael J., 4,696,047, Cl. 382-8.000.

Stahl, Charles R.; Gibson, Michael A.; and Knudsen, Christian W., to Carbotek, Inc. Thermally-enhanced oil recovery method and apparatus. 4,694,907, Cl. 166-303.000.

Stahl, Matts F.: *See—*
Ekelund, Folke J. B.; Lilja, Per O.; Wald, Roland J. E.; and Stahl, Matts F., 4,695,413, Cl. 361-18.000.

Stanadyne, Inc.: *See—*
Kowal, Steven J., 4,694,790, Cl. 123-90.580.

Stand, Mille: *See—*
Karlsson, Axel T.; and Stand, Mille, 4,694,990, Cl. 239-81.000.

Standard Elektrik Lorenz AG: *See—*
Viohl, Uwe, 4,695,477, Cl. 427-68.000.

Standard Oil Company, The: *See—*
Bar-on, Ari, 4,695,674, Cl. 136-256.000.
Velenyi, Louis J., 4,695,668, Cl. 585-500.000.

Standke, Burkhard: *See—*
Jansen, Martin; and Standke, Burkhard, 4,695,353, Cl. 204-96.000.

Stanilov, Krestyo A.: *See—*
Popov, Entcho N.; Stanilov, Krestyo A.; Apostolov, Rumen K.; Dundarov, Pantcho G.; Radkov, Peyu V.; Aderski, Pentcho K.; and Georgiev, Georgi A., 4,695,754, Cl. 310-156.000.

Stant Inc.: *See—*
Harris, Robert S., 4,694,857, Cl. 137-565.000.
Szlaga, Emil, 4,694,847, Cl. 137-39.000.

Stanton, James R.; and Legg, James R. Lighting fixture. 4,695,114, Cl. 439-573.000.

Starbuck, Arthur E. Nonaqueous coal cleaning process. 4,695,371, Cl. 209-211.000.

Stark, William C. Paint shields and painting methods. 4,695,486, Cl. 427-282.000.

Stauffer Chemical Company: *See—*
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.
Heather, James B.; and Milano, Pamela D., 4,695,673, Cl. 568-310.000.
Leon, Albert M., 4,695,443, Cl. 423-443.000.

STC plc: *See—*
Oswald, Thomas, 4,696,060, Cl. 455-601.000.

STEC Inc.: *See—*
Shimizu, Tetsuo; Tujimura, Kiyoharu; and Iwamoto, Michinori, 4,695,034, Cl. 251-129.060.

Steenbergen, Christiaan; Howard, Peter G.; Bracht, Roger R.; and van der Put, Henk, to Laser Magnetic Storage International Company. Method and apparatus for varying laser intensity level. 4,695,994, Cl. 369-54.000.

Steer, Graham E., to Craig Medical Products Limited. Incontinence briefs and pants. 4,695,279, Cl. 604-397.000.

Steffen, Jurg: *See—*
Mayor, Jean-Michel; Steffen, Jurg; and Wuthrich, Peter, 4,695,698, Cl. 219-121.00L.

Steigerwald, Robert L.; and Mistry, Keku M., to General Electric Company. Multiple output resonant power supply. 4,695,934, Cl. 363-17.000.

Stein, Hermann: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Steinhardt, Lothar: *See—*
Giehl, Klaus U., 4,694,854, Cl. 137-519.000.

Steinman, Lawrence; Waldor, Matthew K.; Sriram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., to Leland Stanford Junior University, The Board of Trustees of. Method of treating autoimmune diseases that are mediated by Leu3/CD4 phenotype T cells. 4,695,459, Cl. 424-95.000.

Stemcor Corporation: *See—*
Korzekwa, Tadeusz M.; McMurtry, Carl H.; and Boecker, Wolfgang D. G., 4,695,294, Cl. 51-307.000.

Stemmer, Horst-Heinz: *See—*
Rahmede, Karl-Heinz; and Stemmer, Horst-Heinz, 4,695,181, Cl. 403-135.000.

Stendel, Wilhelm: *See—*
Kruger, Bernd-Wieland; Behrenz, Wolfgang; Becker, Benedikt; Homeyer, Bernhard; and Stendel, Wilhelm, 4,695,563, Cl. 514-105.000.

Stender, Werner: *See—*
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Stephenson, Graham W.; and Toft, Richard C., to British Petroleum Company p.l.c., The. Riser support system. 4,694,909, Cl. 166-359.000.

Sterling Drug Inc.: *See—*
Philion, Richard E., 4,695,589, Cl. 514-653.000.

Stern, Robert; Hillion, Gerard; Gateau, Paul; and Guibet, Jean-Claude, to Institut Francais du Petrol. Process for manufacturing a composition of fatty acid esters useful as gas oil substitute motor fuel with hydrated ethyl alcohol and the resultant esters composition. 4,695,411, Cl. 260-410.90R.

Sterner, Maurice E., Jr.: *See—*
Ecker, Warren S.; Ecker, Howard J.; Ecker, Robert S.; and Sterner, Maurice E., Jr., 4,694,552, Cl. 29-418.000.

Sternglass, Ernest J.: *See—*
Sashin, Donald; and Sternglass, Ernest J., 4,696,022, Cl. 378-41.000.

Stetter, Jorg: *See—*
Gehring, Reinhold; Lindig, Markus; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Stetter, Jorg, 4,695,308, Cl. 71-86.000.

Stevens, James C.; and Fordyce, William A., to Dow Chemical Company, The. Process for propylene dimerization. 4,695,669, Cl. 585-511.000.

Stevenson, Arthur, to Robinson Brothers Limited. Vulcanizable rubber compositions containing xanthogen polysulfide and xanthate compounds. 4,695,609, Cl. 525-352.000.

Stihl, Andreas: *See—*
Kemmler, Ralf-Rainer, 4,694,578, Cl. 30-383.000.

Stockinger, Paul A.: *See—*
Lindberg, Verne L.; and Stockinger, Paul A., 4,695,019, Cl. 248-74.300.

Stoll, Karl-Heinz, to Senkingwerk GmbH. Counterflow washing machine. 4,694,665, Cl. 68-27.000.

Storage Research Pty. Ltd.: *See—*
Hudson, Geoffrey M., 4,695,991, Cl. 369-44.000.

Stormax International A/S: *See—*
Bech, Marcus C.; and Koster, Ole, 4,694,637, Cl. 53-448.000.

Stouffer, Ronald D., to Bowles Fluidics Corporation. Novel inertance loop construction for air sweep fluidic oscillator. 4,694,992, Cl. 239-265.230.

Stowe, Lawrence R.: *See—*
Jones, Lloyd G.; and Stowe, Lawrence R., 4,694,727, Cl. 86-20.150.

Strachan, Alan F.: *See—*
Rose, K. Daniel; Yarbrough, Charles; and Strachan, Alan F., 4,694,973, Cl. 221-46.000.

Strand, Jerome E., to Minnesota Mining and Manufacturing Company. Biomedical electrode. 4,694,835, Cl. 128-640.000.

Straus, Jozef: *See—*
Sinclair, William J.; Kovats, Tibor F. I.; and Straus, Jozef, 4,695,125, Cl. 350-96.200.

Strauss, Richard F.; Herb, Phillip; Noorily, Peter; and Rodrigues, Julio, to Thomas & Betts Corporation. Flat multiconductor cable for undercarpet wiring system. 4,695,679, Cl. 174-117.0FF.

Straw, Alan; and Shields, Stewart, to Colgate-Palmolive Company. Aerosol antiperspirant composition. 4,695,451, Cl. 424-47.000.

Street, Robert W., to General Tire, Inc. Machine for guiding and marking plystock. 4,694,580, Cl. 33-32.600.

Strein, Klaus: *See—*
Mertens, Alfred; Holck, Jens-Peter; Berger, Herbert; Muller-Beckmann, Bernd; Strein, Klaus; and Roesch, Egon, 4,695,567, Cl. 514-253.000.

Strenk, Lawrence M.: *See—*
Kramer, David M.; Compton, Russell A.; Strenk, Lawrence M.; and Murdoch, James B., 4,695,800, Cl. 324-309.000.

Strohbeen, David T.: *See—*
Westphal, Dean W.; and Strohbeen, David T., 4,694,978, Cl. 223-28.000.

Studiengesellschaft fur Eisenerzaufbereitung: *See—*
Kortmann, Heinrich; and Bock, Wolfgang, 4,695,315, Cl. 75-0.50R.

Studiengesellschaft Kohle mbH: *See—*
Bogdanovic, Borislav, 4,695,446, Cl. 423-648.00R.

Suda, Koichi: *See—*
Nomura, Yoshihisa; Suda, Koichi; and Kozawa, Tadashi, 4,694,734, Cl. 92-130.00R.

Sudo, Yoshimi: *See—*
Kuwabara, Hideki; Kitagawa, Atsushi; and Sudo, Yoshimi, 4,695,593, Cl. 521-60.000.

Suehiro, Teruyoshi: *See—*
Sakaguchi, Haruo; Suehiro, Teruyoshi; Nagai, Kunio; Hashimoto, Toshie; Nishiyama, Hisaki; and Mohri, Masakazu, 4,694,885, Cl. 164-416.000.

Suenaga, Hiroyoshi: *See—*
Ouchi, Chiaki; Niikura, Masakazu; and Suenaga, Hiroyoshi, 4,694,985, Cl. 228-235.000.

Sugihara, Kazuyoshi: *See—*
Matsumoto Yoshiaki; Yamagata, Shinji; and Sugihara, Kazuyoshi, 4,695,814, Cl. 337-77.000.

Sugihara, Masanori; Kurosawa, Atsushi; Okamoto, Akihiko; Shimoda, Kouji; Kimoto, Toshiyuki; and Kouno, Tomomitsu, to Pioneer Electronic Corporation. Automatic loading disc player. 4,695,996, Cl. 369-77.100.

Sugihara, Mitsuru; and Sugimoto, Naohiko, to Fuji Photo Film Co., Ltd. Medium for electrophoresis. 4,695,354, Cl. 204-180.100.

Sugimori, Shigeru: *See—*
Goto, Yasuyuki; Ogawa, Tetsuya; and Sugimori, Shigeru, 4,695,398, Cl. 252-299.500.

Sugimoto, Makoto, to Sanshin Kogyo Kabushiki Kaisha. Frame body of motorcycles. 4,694,929, Cl. 180-311.000.

Sugimoto, Michio: *See—*
Morimoto, Nobuyuki; Takatsu, Kozo; and Sugimoto, Michio, 4,695,440, Cl. 423-328.000.

Sugimoto, Naohiko: *See—*
Sugihara, Mitsuru; and Sugimoto, Naohiko, 4,695,354, Cl. 204-180.100.

Sugimoto, Yasuhiro: *See—*
Hara, Hiroyuki; Nakamura, Michinori; and Sugimoto, Yasuhiro, 4,695,750, Cl. 307-475.000.

Sugimura, Tatsuo: *See—*
Takagi, Yuuji; Satoh, Isao; and Sugimura, Tatsuo, 4,695,993, Cl. 369-54.000.

Suhr, Heinz-Peter; and Weinberger, Bernd, to August Froscher G.m.b.H. & Co. K.G., Firma. Work chair. 4,695,093, Cl. 297-300.000.

Sukagawa, Masaru: *See—*
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.

Sullivan, James B.; and Box, Richard B. Elastomeric shoe innersole. 4,694,589, Cl. 36-44.000.

Sullivan, Roderick B., II; Doshi, Mahesh; and Cooper, Lorne, to Prime Computer, Inc. Digital system simulation method and apparatus having improved sampling. 4,695,968, Cl. 364-578.000.

Sumitani, Koji; Sakai, Tokuji; Yamasaki, Yasuo; and Onodera, Tamio, to Teijin Petrochemical Industries, Ltd. Novel crystalline aluminosilicate zeolites and process for production thereof. 4,695,667, Cl. 585-481.000.

Sumitani, Toshihiko: *See—*
Oda, Koichi; Hatta, Koichi; and Sumitani, Toshihiko, 4,695,983, Cl. 364-709.000.

Sumitomo Chemical Company, Limited: *See—*
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.

Sumitomo Electric Industries, Ltd.: *See—*
Kikuchi, Kenichi, 4,694,563, Cl. 437-40.000.

Sumitomo Light Metal Industries, Ltd.: *See—*
Yoshida, Masahiro; and Inumaru, Susumu, 4,694,888, Cl. 164-467.000.

Sumitomo Metal Mining Company Limited: *See—*
Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaki, 4,695,317, Cl. 75-24.000.

Sumitomo Pharmaceuticals Company, Ltd.: *See—*
Ohashi, Naohito; Nagata, Shoji; Nakatsuka, Masashi; Ishizumi, Kikuo; Katsube, Junki; Aono, Shunji; and Sakurama, Teruo, 4,695,580, Cl. 514-412.000.

Sun Chemical Corporation: *See—*
Floyd, William C.; and Hui, Sai H., 4,695,606, Cl. 525-160.000.

Sundstrand Corporation: *See—*
Beck, Richard, Jr., 4,694,648, Cl. 60-452.000.

Nguyen, Vietson M.; Dhyanchand, P. John; and Thollot, Pierre, 4,695,933, Cl. 363-17.000.

Sunstrand Corporation: *See—*
Dishner, Bryan W.; Juarros, Richard D.; and Dhyanchand, P. John, 4,695,776, Cl. 318-14.000.

Susse, Karl-Ernst; and Weidner, Frank. Method and arrangement for producing ultrashort light pulses. 4,696,009, Cl. 372-25.000.

Sutton, Gary, to General Signal Corporation; and Dempster Systems, Inc. Hydraulic control valve. 4,694,858, Cl. 137-596.000.

Suyama, Hideo: *See—*
Imakoshi, Shigeyoshi; Soda, Yutaka; and Suyama, Hideo, 4,695,908, Cl. 360-119.000.

Suzuki, Eiichi, to Canon Kabushiki Kaisha. Ink-jet recording process. 4,695,846, Cl. 346-1.100.

Suzuki, Hideo; and Nozue, Kazunobu, to Sanshin Kogyo Kabushiki Kaisha. Tilting device for marine propulsion device. 4,695,260, Cl. 440-61.000.

Suzuki, Kazuhiro: *See—*
Himono, Yusaku; Moriya, Yoshiaki; Miyahara, Masato; and Suzuki, Kazuhiro, 4,695,124, Cl. 350-96.200.

Suzuki, Kazumasa: *See—*
Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, 4,695,326, Cl. 127-30.000.

Suzuki, Noboru: *See—*
Yamamoto, Hiromi; Imai, Miho; and Suzuki, Noboru, 4,694,525, Cl. 15-160.000.

Suzuki, Ryoichi: *See—*
Kawamata, Yuuji; Iino, Tomohiko; Suzuki, Ryoichi; and Haga, Noriyuki, 4,695,481, Cl. 427-96.000.

Suzuki, Shigeo; Doi, Yoshiharu; and Soga, Kazuo, to Toa Nenryo Kogyo Kabushiki Kaisha. Catalyst for polymerization of olefins. 4,695,557, Cl. 502-103.000.

Suzuki, Shoji, to Alpine Electronics Inc. Device for controlling pinch roller in cassette tape recorder. 4,694,983, Cl. 226-181.000.

Suzuki, Toshimichi: *See—*
Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, 4,695,598, Cl. 523-400.000.

Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, to Teikoku Hormone Mfg. Co., Ltd. 2-(3,5-dialkyl-4-hydroxyphenyl)indole derivatives. 4,695,581, Cl. 514-415.000.

Suzumura, Masanaga: *See—*
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Swales, Michael G.: *See—*
Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., 4,695,524, Cl. 430-32.000.

Swanson, William M.: *See—*
Wyndham, Ronald; Chaplin, Gervaise M.; and Swanson, William M., 4,695,436, Cl. 423-135.000.

Swearingen, Judson S., to Rotoflow Corporation. Turbine shutdown control system. 4,695,221, Cl. 415-36.000.

Swedo, Raymond J.: *See—*
Zupancic, Joseph J.; and Swedo, Raymond J., 4,695,483, Cl. 427-244.000.

Sweeney, W. Alan, to Chevron Research Company. Nonionic emulsifier and substituted succinic anhydride compositions therewith. 4,695,401, Cl. 252-312.000.

Swisher, Steven L., to Brunswick Corporation. Bait alert for spin cast reel. 4,695,009, Cl. 242-84.10R.

Switchcraft, Inc.: *See—*
Bailey, James R.; and Basov, Emma, 4,695,116, Cl. 439-188.000.
Kysiak, William J., 4,695,117, Cl. 439-188.000.

Szlaga, Emil, to Stant Inc. Roll-over valve with sealing ball. 4,694,847, Cl. 137-39.000.

T. J. Bottom Industries, Inc.: *See—*
Bottom, Michael T., 4,694,876, Cl. 160-45.000.

Tachita, Ryobun; and Teranishi, Akio, to Matsushita Electric Industrial Co., Ltd. Diversity receiver. 4,696,058, Cl. 455-277.000.

Tada, Hideaki, to Mitsubishi Denki Kabushiki Kaisha. Inverter controlling method. 4,695,938, Cl. 363-37.000.

Tada, Teruo: *See—*
Kondo, Kazuo; Ishiguro, Nobuya; and Tada, Teruo, 4,695,491, Cl. 428-35.000.

Taft, Jeffrey D., to Westinghouse Electric Corp. Range finding method and apparatus. 4,695,156, Cl. 356-1.000.

Tagami, Tomoyuki: *See—*
Asakura, Toshimitsu; and Tagami, Tomoyuki, 4,694,924, Cl. 180-68.300.

Takada, Makoto: *See—*
Fujita, Shigeru; Banzai, Hideo; and Takada, Makoto, 4,695,965, Cl. 364-518.000.

Takagi, Shigeru, to Nippon Soken, Inc. Radial flow type dust collecting filter. 4,695,300, Cl. 55-485.000.

Takagi, Yuuji; Satoh, Isao; and Sugimura, Tatsuo, to Matsushita Electric Industrial Co., Ltd. Optical information recording and reproducing apparatus and optical disc. 4,695,993, Cl. 369-54.000.

Takahama, Teizo: *See—*
Sagisawa, Shinobu; Takahama, Teizo; and Kobayashi, Mitsuo, 4,695,963, Cl. 364-513.000.

Takahashi, Akira; Murakami, Yoshiteru; Hirokane, Junji; Katayama, Hiroyuki; and Ohta, Kenji, to Sharp Kabushiki Kaisha. Magneto-optical memory element. 4,695,514, Cl. 428-432.000.

Takahashi, Akira: *See*—
Komatsubara, Masahiro; Kamimura, Tetsuro; Inanaga, Takugi; and Takahashi, Akira, 4,695,011, Cl. 242-199.000.
Kurokawa, Ryogo; Oyama, Fusami; and Takahashi, Akira, 4,695,069, Cl. 280-91.000.

Takahashi, Junichi: *See*—
Itagaki, Masanori; Takahashi, Junichi; and Endou, Hideyasu, 4,695,678, Cl. 174-52.0FP.

Takahashi, Kenji: *See*—
Mori, Nobufumi; Hosoi, Yuichi; Takahashi, Kenji; and Miyahara, Junji, 4,695,725, Cl. 250-327.200.

Takahashi, Sadatoshi: *See*—
Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, 4,695,133, Cl. 350-427.000.

Takahashi, Tadashi; Miyashita, Kunio; and Kawamata, Syoichi, to Hitachi, Ltd. Crank angle sensor. 4,694,688, Cl. 73-116.000.

Takahashi, Toshio: *See*—
Hayase, Yoshio; Ohtsuka, Toshikazu; Ide, Kinya; and Takahashi, Toshio, 4,695,312, Cl. 71-92.000.

Takahata, Hisatoshi: *See*—
Terui, Nobuhiko; and Takahata, Hisatoshi, 4,695,148, Cl. 354-413.000.

Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, to Sharp Kabushiki Kaisha. Image processing device. 4,695,966, Cl. 364-521.000.

Takano, Kunio; and Nukushina, Masanori, to Tokyo Juki Industrial Co., Ltd. Sewing machine control apparatus. 4,694,762, Cl. 112-121.120.

Takanohashi, Kunio; Yoshida, Tsuneaki; and Fujii, Shoichiro, to Takeda Chemical Industries, Ltd. Thiazole derivatives. 4,695,639, Cl. 548-165.000.

Takasago Perfumery Co., Ltd.: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Takashima, Akira: *See*—
Makino, Hiroshi; Yoshino, Tsunemi; Kihara, Tadaharu; and Takashima, Akira, 4,695,893, Cl. 358-227.000.

Takasu, Noboru: *See*—
Ishida, Masahiro; Kato, Shunichi; and Takasu, Noboru, 4,694,999, Cl. 242-4.00R.

Takasuga, Shunzo: *See*—
Yagii, Koji; Miyata, Jun; and Takasuga, Shunzo, 4,695,699, Cl. 219-121.0LD.

Takasugi, Sumio: *See*—
Kageyama, Kunio; and Takasugi, Sumio, 4,695,508, Cl. 428-261.000.

Takatsu, Kozo: *See*—
Morimoto, Nobuyuki; Takatsu, Kozo; and Sugimoto, Michio, 4,695,440, Cl. 423-328.000.

Takatsu, Norihiko: *See*—
Kawahara, Atsushi; and Takatsu, Norihiko, 4,696,021, Cl. 377-58.000.

Takazoe, Ichiro; Ohta, Kosei; Shimizu, Junichi; Suzuki, Kazumasa; Iwakura, Tatsuya; and Nakajima, Yoshikazu, to Mitsui Sugar Co., Ltd. Low-cariogenic sweetners. 4,695,326, Cl. 127-30.000.

Takeda Chemical Industries, Ltd.: *See*—
Goto, Giichi; and Saji, Yoshiaki, 4,695,572, Cl. 514-278.000.
Takanohashi, Kunio; Yoshida, Tsuneaki; and Fujii, Shoichiro, 4,695,639, Cl. 548-165.000.

Takeda Chemical Industry, Ltd.: *See*—
Kigasawa, Kazuo; Ohtani, Hideaki; Tanaka, Makoto; and Hayashida, Shigeru, 4,695,465, Cl. 424-449.000.

Takeda, Masami, to Canon Kabushiki Kaisha. Method of molding a member having undercut portions. 4,695,421, Cl. 264-318.000.

Takeda, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Switchgear. 4,695,741, Cl. 307-643.000.

Takeda Riken Kogyo Kabushikikaisha: *See*—
Nakajima, Takayuki; Aoki, Tetsuo; Kobayashi, Katsumi; and Akiyama, Noboru, 4,696,004, Cl. 371-25.000.

Takei, Masahiro; Kozuki, Susumu; Masui, Toshiyuki; Hirasawa, Masahide; and Kashida, Motokazu, to Canon Kabushiki Kaisha. Data storing device having position determining means. 4,696,008, Cl. 371-47.000.

Takekoshi, Tohru; and Anderson, Patricia P., to General Electric Company. Secondary amine-terminated oligomers and copolyurethanecarbonates prepared therefrom. 4,695,612, Cl. 525-433.000.

Takeoka, Seiei, to Niles Parts Co., Ltd. Apparatus for preventing a roundabout of supersonic wave in a supersonic wave transmitter and receiver for a vehicle. 4,695,985, Cl. 367-87.000.

Takesako, Sumiyoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Apparatus for sorting sheets. 4,694,963, Cl. 209-534.000.

Takeuchi, Hajime: *See*—
Hashimoto, Minoru; Takeuchi, Hajime; and Itoh, Takeo, 4,695,513, Cl. 428-425.900.

Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, to Dai Nippon Insatsu Kabushiki Kaisha; and Mitsubishi Jukogyo Kabushiki Kaisha. Method of presetting plate cylinders for registering in an offset printing press. 4,694,749, Cl. 101-426.000.

Takeuchi, Koji: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Mikami, Naoko; Akaiwa, Kiriko; and Takeuchi, Koji, 4,695,651, Cl. 560-141.000.

Takeuchi, Masashi: *See*—
Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, 4,695,525, Cl. 430-151.000.

Takeuchi, Mikio: *See*—
Yamazaki, Yoshihide; Uchimura, Kazumi; Yamashita, Satoshi; and Takeuchi, Mikio, 4,695,614, Cl. 526-142.000.

Takeuchi, Yasuhito; Hirota, Yuichi; Sano, Shinichi; and Ishiguro, Shinichi, to Yokogawa Medical Systems, Limited. Ultrasound diagnostic equipment. 4,694,680, Cl. 73-1.0DV.

Takeuchi, Yukihisa: *See*—
Okajima, Atushi; Yoshida, Hitoshi; Takeuchi, Yukihisa; and Fukutani, Masanori, 4,695,301, Cl. 55-523.000.

Takezawa, Hatsuo; Donuma, Kenichi; Katagiri, Shuhei; and Sakura, Shigeyuki, to Tokyo Shibaura Denki Kabushiki Kaisha. Duplex optical communication module unit. 4,695,858, Cl. 357-19.000.

Takizawa, Shozo: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Talend, Donald R., to Corcom, Inc. Telephone connector with bypass capacitor. 4,695,115, Cl. 439-76.000.

Tallis, John R., Jr.; and Volino, Nicholas A., to Facet Enterprises, Inc. Engine starter drive with integral starter relay. 4,695,735, Cl. 290-38.00R.

Tamfelt Oy Ab: *See*—
Salminen, Ari, 4,695,015, Cl. 245-6.000.

Tanaka, Atsuo: *See*—
Tatematsu, Yoshiaki; and Tanaka, Atsuo, 4,694,735, Cl. 92-208.000.

Tanaka, Kunio: *See*—
Nakaya, Keiichi; and Tanaka, Kunio, 4,695,445, Cl. 423-635.000.

Tanaka, Makoto: *See*—
Kigasawa, Kazuo; Ohtani, Hideaki; Tanaka, Makoto; and Hayashida, Shigeru, 4,695,465, Cl. 424-449.000.

Tanaka, Masami, to Showa Precision Machinery Co., Ltd. Starting device with air motor for internal combustion engines. 4,694,791, Cl. 123-179.00F.

Tanaka, Minoru: *See*—
Terahara, Akira; and Tanaka, Minoru, 4,695,587, Cl. 514-510.000.

Tanaka, Tadao: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Tanaka, Teruo; Tanaka, Teruya; and Kitamura, Masato, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Process for forming moisture-permeable waterproof coating on fabrics. 4,695,484, Cl. 427-245.000.

Tanaka, Teruya: *See*—
Tanaka, Teruo; Tanaka, Teruya; and Kitamura, Masato, 4,695,484, Cl. 427-245.000.

Tanaka, Toyoji: *See*—
Fujisawa, Kunio; Tanaka, Toyoji; Mochizuki, Toshio; Nakamura, Norio; and Kaya, Seiji, 4,694,748, Cl. 101-401.100.

Tanaka, Tsunefumi: *See*—
Kitagishi, Nozomu; Takahashi, Sadatoshi; Ikemori, Keiji; Momiyama, Kikuo; and Tanaka, Tsunefumi, 4,695,133, Cl. 350-427.000.

Tanaka, Yasuhiro, to Murata Manufacturing Co., Ltd. Laminated terminal layer for electronic component. 4,695,756, Cl. 310-355.000.

Tandon, Jagdish C.; and Araghi, Mehdi N., to Xerox Corporation. Image sensor array for assembly with like arrays to form a longer array. 4,695,716, Cl. 250-211.00R.

Tani, Kazuhide: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Taniguchi, Yasutaka: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Taniguchi, Yoshiya, to Toyo Machinary & Metal Co., Ltd. Injection molder. 4,695,238, Cl. 425-145.000.

Tanoue, Shohachi: *See*—
Morishita, Takashi; Hata, Takehisa; Mori, Mitio; and Tanoue, Shohachi, 4,695,466, Cl. 424-456.000.

Taplin, Lael B., to Vickers, Incorporated. Power transmission. 4,695,230, Cl. 417-218.000.

Tarozzi, Richard A., to King-Seeley Thermos Co. Automatic drip coffee maker. 4,694,738, Cl. 99-279.000.

Tartar, Andre: *See*—
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.

Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin: *See*—
Zhigalov, Gennady V.; Abduganiev, Abdurakhim; Kim, Sergei Y.; and Mosheev, Robert R., 4,694,642, Cl. 57-5.000.

Tassone, Joseph V.; and Candor, James T., to Dayco Products, Inc. Layer of reinforced polymeric material, method and apparatus for making the same and a product containing the same. 4,695,269, Cl. 474-268.000.

Tate, Ralph, Jr.; and Woods, John T., to Whirlpool Corporation. Method of manufacturing refrigeration apparatus cabinet construction utilizing prepainted steel panels. 4,694,553, Cl. 29-445.000.

Tatematsu, Yoshiaki; and Tanaka, Atsuo, to Toyota Jidosha Kabushiki Kaisha. Piston for internal combustion engine. 4,694,735, Cl. 92-208.000.

Tatemoto, Minoru: *See*—
Kobayashi, Kazuyoshi; Takizawa, Shozo; Tanaka, Tadao; Harara, Mitsuhiko; Taniguchi, Yasutaka; Suzumura, Masanaga; Tatemoto, Minoru; and Kumagai, Naotake, 4,695,074, Cl. 280-707.000.

Tatsu, Kunihiko: *See*—
Komatsu, Teruaki; Kobayashi, Kiyoshi; Tatsu, Kunihiko; and Shibata, Shoichi, 4,695,065, Cl. 279-60.000.

Taub, Ronald H. Standard dimension pallet assembly formed of separate abutted segments. 4,694,962, Cl. 206-600.000.

Tauschmann, Otto. Conduit. 4,694,865, Cl. 138-148.000.

Taylor, Edward C.; Katz, Alan H.; Bull, Randy A.; Byers, Lance R.; and Brown, Richard A., to FMC Corporation. Aryl carboxylate process. 4,695,658, Cl. 568-763.000.

Taylor, Greg: *See*—
Silvestri, Frank, 4,694,726, Cl. 84-413.000.

Taylor, Kenneth W., to University of Toronto Innovations Foundation. Scanning apparatus. 4,696,025, Cl. 378-146.000.

Taylor, Peter W., to Molecular Diagnostics, Inc. Enzymatic detection of bacterial capsular polysaccharide antigens. 4,695,541, Cl. 435-18.000.

Tazaki, Shigemitsu, to Canon Kabushiki Kaisha. Ink storing apparatus with a first case having plural ink tanks and second case having one ink tank and a waste ink receptacle. 4,695,824, Cl. 346-140.00R.

Teach, Eugene G.: *See*—
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.

Technical Oil Tools Corporation: *See*—
Brown, Gregory D.; Clark, Darrel E.; and Schuermann, Rodger W., 4,694,692, Cl. 73-155.000.

Technicare Corporation: *See*—
Kramer, David M.; Compton, Russell A.; Strenk, Lawrence M.; and Murdoch, James B., 4,695,800, Cl. 324-309.000.

Technicon Instruments Corporation: *See*—
Farrell, Gregory A., 4,695,431, Cl. 422-81.000.

Tecnomare S.p.A.: *See*—
Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, 4,695,193, Cl. 405-204.000.

Tecumseh Products Company: *See*—
Gannaway, Edwin L., 4,694,660, Cl. 62-196.400.

Teder, Rein S.: *See*—
Bonin, Wayne A.; McCumber, Roger D.; and Teder, Rein S., 4,694,687, Cl. 73-116.000.

Teijin Petrochemical Industries, Ltd.: *See*—
Sumitani, Koji; Sakai, Tokuji; Yamasaki, Yasuo; and Onodera, Tamio, 4,695,667, Cl. 585-481.000.

Teikoku Hormone Mfg. Co., Ltd.: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.

Tektronix, Inc.: *See*—
Barrett, Ronald A., 4,695,806, Cl. 330-254.000.
Grellmann, Heinz E.; and Roland, Leonard A., 4,695,811, Cl. 333-105.000.
Leber, David C.; and Falk, Timothy L., 4,694,572, Cl. 29-840.000.

Telechron, Inc.: *See*—
Wingler, William C.; and Pomponio, Edward V., 4,695,683, Cl. 200-38.00R.

Teleflex Incorporated: *See*—
Frankhouse, Thomas J.; and Spease, Arthur L., 4,694,705, Cl. 74-501.00R.

Telefonaktiebolaget LM Ericsson: *See*—
Ekelund, Folke J. B.; Lilja, Per O.; Wald, Roland J. E.; and Stahl, Matts F., 4,695,413, Cl. 361-18.000.

Telefunken electronic GmbH: *See*—
Annacker, Ralph; and Dietl, Joachim, 4,695,807, Cl. 330-310.000.
Mahalek, Josef; and Vetter, Egon, 4,695,915, Cl. 361-56.000.
Rein, Hans-Martin, 4,695,940, Cl. 363-157.000.

Telesciences, Inc.: *See*—
Cohen, Fred, 4,696,029, Cl. 379-92.000.

Tellier, Yves: *See*—
Sibertin-Blanc, Jean-Baptiste; and Tellier, Yves, 4,694,931, Cl. 182-3.000.

Tempmaster Corporation: *See*—
Carlson, Melvin C.; and Dean, Raymond H., 4,694,988, Cl. 236-49.000.
Carlson, Melvin C.; and Dean, Raymond H., 4,694,989, Cl. 236-49.000.

Tennant, Robert J.: *See*—
Feldman, Steven; and Tennant, Robert J., 4,695,106, Cl. 439-83.000.

Terahara, Akira; and Tanaka, Minoru, to Sankyo Company Limited. M-4 and IsoM-4 derivatives, their preparation and compositions containing them. 4,695,587, Cl. 514-510.000.

Teramachi, Hiroshi. Endless ball spline. 4,695,170, Cl. 384-45.000.

Teranishi, Akio: *See*—
Tachita, Ryobun; and Teranishi, Akio, 4,696,058, Cl. 455-277.000.

Terasaka, Satoru: *See*—
Enzaki, Yoshiki; Kitahara, Kazuki; Terasaka, Satoru; Mori, Kenji; and Kimura, Takeshi, 4,695,247, Cl. 431-352.000.

Terasawa, Koji, to Canon Kabushiki Kaisha. Ink jet printer. 4,695,851, Cl. 346-140.00R.

Terracol, Claude; and Roulet-Dubonnet, Jean-Pierre, to Merlin Gerin. Shunt effect low voltage circuit breaker. 4,695,913, Cl. 361-13.000.

Terui, Nobuhiko; and Takahata, Hisatoshi, to Nippon Kogaku K. K. Flash photographing system. 4,695,148, Cl. 354-413.000.

Terumo Kabushiki Kaisha: *See*—
Shinno, Kouji; and Kuboki, Hitoshi, 4,695,276, Cl. 604-283.000.

Tetron, Inc.: *See*—
Hammond, Martin L.; and Ramiller, Charles L., 4,694,779, Cl. 118-730.000.

Teuchert, Eberhardt; Haas, Klaus-Arne; and Gerwin, Helmut, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Method for loading, operating, and unloading a ball-bed nuclear reactor. 4,695,423, Cl. 376-265.000.

Texas Instruments Incorporated: *See*—
Chatterjee, Pallab K., 4,695,872, Cl. 357-75.000.
Christian, Donald J.; and Stachowicz, Michael J., 4,696,047, Cl. 382-8.000.
Doddington, George R.; and Secrest, Bruce G., 4,696,038, Cl. 381-38.000.
Doddington, George R., 4,696,039, Cl. 381-46.000.
Doddington, George R.; and Papamichalis, Panos E., 4,696,040, Cl. 381-46.000.
Goudie, Kathleen M., 4,695,962, Cl. 364-513.500.
Goudie, Kathleen M., 4,696,042, Cl. 381-51.000.
Harshaw, Robert C., 4,696,012, Cl. 372-99.000.
Provence, John D.; Brown, Frederick W.; and Jones, John I., 4,695,700, Cl. 219-121.0PD.
Renner, Karl H.; and Morton, Alec J., 4,695,970, Cl. 364-724.000.
Thatte, Satish; and Oxley, Donald W., 4,695,949, Cl. 364-200.000.
Tuvell, James A.; and Smayling, Michael C., 4,695,979, Cl. 365-185.000.

Texaust Australia Limited: *See*—
Towner, Geoffrey F.; and Carter, Charles A., 4,694,910, Cl. 166-379.000.

Thatte, Satish; and Oxley, Donald W., to Texas Instruments Incorporated. Method for efficient support for reference counting. 4,695,949, Cl. 364-200.000.

Theiler, Richard F.: *See*—
Caswell, Michael L.; Corr, James J.; Dobrovolny, Mark S.; Lander, Lynn H.; Narath, William R.; and Theiler, Richard F., 4,695,395, Cl. 252-121.000.

Thermacore, Inc.: *See*—
Eastman, George Y., 4,696,010, Cl. 372-34.000.

Theuner, Hans-Werner: *See*—
Dreckmann, Karl; Schneider, Jakob; and Theuner, Hans-Werner, 4,695,346, Cl. 156-361.000.

Thibault, Jean, to Eastman Kodak Company. Apparatus and method for preventing the formation of a deposit from a processing solution on a film transport member. 4,695,147, Cl. 354-322.000.

Thollot, Pierre: *See*—
Nguyen, Vietson M.; Dhyanchand, P. John; and Thollot, Pierre, 4,695,933, Cl. 363-17.000.

Thomas & Betts Corporation: *See*—
Strauss, Richard F.; Herb, Phillip; Noorily, Peter; and Rodrigues, Julio, 4,695,679, Cl. 174-117.0FF.

Thomas, Karen A., to Olin Corporation. Continuous production of low density base grain with a salt-free liquor. 4,694,753, Cl. 102-289.000.

Thompson, Kenneth A.: *See*—
Rozema, John G.; and Thompson, Kenneth A., 4,696,016, Cl. 375-20.000.

Thompson, Robert E.: *See*—
Collier, Ronald T.; and Thompson, Robert E., 4,694,722, Cl. 83-885.000.

Thomson-CSF: *See*—
Barre, Lucien, 4,695,927, Cl. 361-400.000.
Billet, Daniel; and Cesarini, Jean F., 4,695,787, Cl. 324-557.000.
Blanchard, Pierre; Descure, Pierrick; and Chautemps, Jacques, 4,695,860, Cl. 357-24.0LR.
Boucharlat, Gilles; and Brissot, Louis, 4,695,890, Cl. 358-213.310.
Noguier, Jean P.; and Montaut, Jean P., 4,695,863, Cl. 357-38.000.
Portmann, Jacques, 4,695,889, Cl. 358-213.260.

Thomson, Peter: *See*—
Daintrey, Joseph W.; and Thomson, Peter, 4,694,739, Cl. 99-289.00R.

Thomson, Timothy M.: *See*—
Cote, Richard J.; Thomson, Timothy M.; Houghton, Alan N.; Oettgen, Herbert F.; Old, Lloyd J.; and Cardo, Carlos C., 4,695,538, Cl. 435-7.000.

Thones, Gustav, to L. & C. Steinmuller GmbH. Heat exchanger for heat exchange between hot gas and medium flowing through tube bundles. 4,694,897, Cl. 165-160.000.

Thorud, Richard A.; and White, Donald M., III, to Toro Company, The. Single stage snowthrower. 4,694,594, Cl. 37-244.000.

Tilles, Harry: *See*—
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.

Time Video Information Services, Inc.: *See*—
Jacobson, Dov, 4,695,832, Cl. 340-709.000.

Timme, William F. Auxiliary stimulation apparatus for apnea distress. 4,694,839, Cl. 128-721.000.

Timmerman, Tom; and Chapman, Norman V. Piston apparatus. 4,694,785, Cl. 123-52.00A.

Titov, Mikhail I.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Titova, Galina P.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.

Titus, John D., to Motorola, Inc. Fuze actuating method having an adaptive time delay. 4,694,752, Cl. 102-215.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Suzuki, Shigeo; Doi, Yoshiharu; and Soga, Kazuo, 4,695,557, Cl. 502-103.000.

Tobe, Akihiro: *See—*
Ninomiya, Kunihiro; Nitta, Issei; Tobe, Akihiro; Egawa, Mitsuo; and Kikumoto, Ryoji, 4,695,568, Cl. 514-258.000.

Tobita, Youichi, to Mitsubishi Denki Kabushiki Kaisha. Substrate potential generating circuit. 4,695,746, Cl. 307-297.000.

Todd, Richard S.: *See—*
Boyle, John T. A.; and Todd, Richard S., 4,695,574, Cl. 514-313.000.

Tofigh, Farshid: *See—*
Jackson, Kenneth R.; and Tofigh, Farshid, 4,695,917, Cl. 361-58.000.

Toft, Richard C.: *See—*
Stephenson, Graham W.; and Toft, Richard C., 4,694,909, Cl. 166-359.000.

Togawa, Yoichi: *See—*
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Tokai, Masaya: *See—*
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.

Tokai TRW & Co., Ltd.: *See—*
Nagae, Kiyoshi, 4,694,927, Cl. 180-132.000.

Tokico Ltd.: *See—*
Amemori, Hiroyuki; Nishiyama, Shigeru; and Iwamoto, Tetsuo, 4,694,702, Cl. 73-861.240.

Tokyo Juki Industrial Co., Ltd.: *See—*
Takano, Kunio; and Nukushina, Masanori, 4,694,762, Cl. 112-121.120.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Kimoto, Katsumi, 4,695,989, Cl. 369-32.000.
Sakata, Tomio, 4,696,041, Cl. 381-46.000.
Takesako, Sumiyoshi, 4,694,963, Cl. 209-534.000.
Takezawa, Hatsuo; Donuma, Kenichi; Katagiri, Shuhei; and Sakura, Shigeyuki, 4,695,858, Cl. 357-19.000.
Tsunoda, Yoshiaki; and Matsuda, Hideo, 4,695,871, Cl. 357-74.000.

Tolman, Richard L.: *See—*
Marburg, Stephen; Tolman, Richard L.; and Kniskern, Peter J., 4,695,624, Cl. 530-395.000.

Tomida, Yasutaka, to Brother Kogyo Kabushiki Kaisha. Printing apparatus with a thermal print head. 4,695,173, Cl. 400-120.000.

Tomikawa, Shinichiro: *See—*
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.

Tominaga, Hiroshi, to Fuji Electric Co., Ltd. Human body supporting device. 4,694,521, Cl. 5-453.000.

Tomorrow Group, Inc., The: *See—*
Parnell, Raymond, 4,694,965, Cl. 211-87.000.

Tonohara, Yoshiharu: *See—*
Noguchi, Takayo; Togawa, Yoichi; Nishimoto, Tsuneo; Tonohara, Yoshiharu; Rokkaku, Tadashi; Nakai, Seigo; Araki, Michio; and Kitano, Kahei, 4,695,209, Cl. 409-42.000.

Toomey, Joseph E., Jr., to Reilly Tar & Chemical Corporation. Electrochemical reduction of pyridine carboxamide bases. 4,695,352, Cl. 204-74.000.

Topfl, Rosemarie, to Ciba-Geigy Corporation. Process for improving the colour yield and wetfastness properties of dyeings or prints produced on cellulosic fabrics with anionic dyes: treatment with cationic imidazole. 4,695,289, Cl. 8-573.000.

Torabi, Mohammad T. Double-hung closure for access openings. 4,694,609, Cl. 49-193.000.

Toray Industries, Inc.: *See—*
Watanabe, Koji; Okamoto, Miyoshi; Mori, Yuichi; and Noishiki, Yasuharu, 4,695,280, Cl. 623-1.000.

Torelli, Guido; and De La Plaza, Alejandro, to SGS Microelectronica S.p.A. System for expanding the stereo base of stereophonic acoustic diffusion apparatus. 4,696,035, Cl. 381-1.000.

Toro Company, The: *See—*
Comer, Robert C.; Hampel, Wilbur J.; and Rogers, Edward A., 4,694,528, Cl. 15-330.000.
Thorud, Richard A.; and White, Donald M., III, 4,694,594, Cl. 37-244.000.

Torremans, Joseph L. G.: *See—*
Janssens, Frans E.; Torremans, Joseph L. G.; Hens, Jozef E.; and Van Offenwert, Theophilus T. J. M., 4,695,569, Cl. 514-258.000.
Janssens, Frans E.; Kennis, Ludo E. J.; Hens, Jozef F.; Torremans, Joseph L. G.; and Diels, Gaston S. M., 4,695,575, Cl. 514-322.000.

Toshiba Kikai Kabushiki Kaisha: *See—*
Fujita, Shigeru; Banzai, Hideo; and Takada, Makoto, 4,695,965, Cl. 364-518.000.

Toth Aluminum Corporation: *See—*
Wyndham, Ronald; Chaplin, Gervaise M.; and Swanson, William M., 4,695,436, Cl. 423-135.000.

Toth, James E.: *See—*
Shacklette, Lawrence W.; Toth, James E.; and Elsenbaumer, Ronald L., 4,695,521, Cl. 429-194.000.

Touhsaent, Robert E.: *See—*
Liu, Leland L.; and Touhsaent, Robert E., 4,695,503, Cl. 428-207.000.

Towae, Friedrich: *See—*
Merger, Franz; and Towae, Friedrich, 4,695,645, Cl. 560-24.000.

Towner, Geoffrey F.; and Carter, Charles A., to Texaust Australia Limited. Packing tube assembly for pumping wells. 4,694,910, Cl. 166-379.000.

Towns, Edward J.: *See—*
Proctor, John D.; Towns, Edward J.; and Brown, Edward M., 4,694,968, Cl. 215-224.000.

Townsend Engineering Company: *See—*
Townsend, Ray T., 4,694,536, Cl. 17-37.000.

Townsend, Ray T., to Townsend Engineering Company. Compound pump mechanism for meat encasing machines and the like. 4,694,536, Cl. 17-37.000.

Toyne, Kenneth J.: *See—*
Balkwill, Peter H.; Bishop, David I.; Pearson, Andrew D.; Sage, Ian C.; Gray, George W.; Lacey, David; Toyne, Kenneth J.; and McDonnell, Damien G., 4,695,131, Cl. 350-350.00R.

Toyo Boseki Kabushiki Kaisha: *See—*
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.

Toyo Machinary & Metal Co., Ltd.: *See—*
Taniguchi, Yoshiya, 4,695,238, Cl. 425-145.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Tsuzuki, Kenji; and Uotani, Takeshi, 4,695,644, Cl. 558-249.000.

Toyosawa, Yukio: *See—*
Kurakake, Mitsuo; Sakamoto, Keiji; and Toyosawa, Yukio, 4,695,780, Cl. 318-561.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Hayashi, Souichi; Miyake, Johji; Koyama, Mototsugu; and Sakaguchi, Kanji, 4,695,329, Cl. 148-3.000.
Kato, Kenji; Matsushita, Soichi; and Nakanishi, Kiyoshi, 4,694,794, Cl. 123-306.000.
Miura, Hirohisa; Satoh, Hiroshi; Natsume, Toshio; and Katagiri, Hidenori, 4,695,319, Cl. 75-63.000.
Nakano, Jiro; Ishibashi, Takao; Akatsuka, Takao; and Kawaguchi, Masao, 4,694,809, Cl. 123-489.000.
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.
Nomura, Yoshihisa; Suda, Koichi; and Kozawa, Tadashi, 4,694,734, Cl. 92-130.00R.
Okumura, Katsuhiro, 4,694,611, Cl. 49-441.000.
Tatematsu, Yoshiaki; and Tanaka, Atsuo, 4,694,735, Cl. 92-208.000.

TP Orthodontics, Inc.: *See—*
Hall, Arthur B., 4,695,417, Cl. 264-80.000.

Tractiontec Corporation: *See—*
Kemper, Yves J., 4,694,701, Cl. 74-191.000.

Trampnau, Ulrich. Landing aid. 4,695,013, Cl. 244-17.130.

Trautwein, Franz: *See—*
Jorgens, Reinhard; Faltermeier, Bernd; and Trautwein, Franz, 4,695,137, Cl. 350-521.000.

TRE Corporation: *See—*
Ault, Robert M., 4,695,495, Cl. 428-73.000.

Treffner, Charles: *See—*
Treffner, Peter; and Treffner, Charles, 4,695,416, Cl. 264-45.400.

Treffner, Peter; and Treffner, Charles. Method and apparatus for mould-forming expanded plastics form blocks. 4,695,416, Cl. 264-45.400.

Trieselt, Wolfgang: *See—*
Sommer, Karl; Heinz, Robert; Hettche, Albert; Perner, Johannes; Schuster, Werner; and Trieselt, Wolfgang, 4,695,397, Cl. 252-182.000.

Trim-Lok, Inc.: *See—*
Whitener, Gary, 4,695,499, Cl. 428-122.000.

Trimble, Russell L.: *See—*
Rose, Robert J.; and Trimble, Russell L., 4,695,954, Cl. 364-413.000.

Trocciola, John C.; Powers, Joseph; and Martin, Ronald G., to United Technologies Corporation. Silicon carbide matrix for fuel cells. 4,695,518, Cl. 429-12.000.

Tronsli, Sverre N.: *See—*
Oen, Sverre; Poppe, Dag; and Tronsli, Sverre N., 4,695,935, Cl. 363-21.000.

Trudeau, Michael J.: *See—*
Ciletti, Guy D.; and Trudeau, Michael J., 4,694,668, Cl. 70-63.000.

Trusty, Alan J.: *See—*
Curro, John J.; Trusty, Alan J.; and Vernon, George M., 4,695,422, Cl. 264-504.000.

TRW Ehrenreich GmbH & Co. KG: *See—*
Rahmede, Karl-Heinz; and Stemmer, Horst-Heinz, 4,695,181, Cl. 403-135.000.

TRW Inc.: *See—*
Roberts, Maurice P., 4,694,925, Cl. 180-79.100.
Wood, Ruey E., Jr., 4,695,182, Cl. 403-140.000.

Tsivtsivadze, David M.: *See*—
Asatiani, Georgy N.; Pikus, Evgeny A.; Kutelia, Elgudzha R.; Tsivtsivadze, David M.; Mudzhiri, Yason N.; and Dzhalabadze, Nikolai V., 4,695,360, Cl. 204-404.000.

Tsuboi, Noboru: *See*—
Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, 4,695,233, Cl. 418-83.000.

Tsuchida, Tetsuo: *See*—
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,694,938, Cl. 188-181.00A.

Tsugei, Shinji; and Inoue, Tomohiro, to Sharp Kabushiki Kaisha. Pocketable wireless transmitter and receiver. 4,696,054, Cl. 455-89.000.

Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, to Fujitsu Limited. Color printer having apparatus for shifting ink ribbon. 4,695,175, Cl. 400-196.100.

Tsukase, Masaaki; Sato, Kozo; Kitaguchi, Hiroshi; Takeuchi, Masashi; and Kato, Masatoshi, to Fuji Photo Film Co., Ltd. Image forming process. 4,695,525, Cl. 430-151.000.

Tsunoda, Norio: *See*—
Yamashita, Masatoshi; and Tsunoda, Norio, 4,695,059, Cl. 273-360.000.

Tsunoda, Yoshiaki; and Matsuda, Hideo, to Tokyo Shibaura Denki Kabushiki Kaisha. Light-triggered semiconductor device. 4,695,871, Cl. 357-74.000.

Tsurumaki, Kazuyoshi: *See*—
Ohtsuki, Tomonari; and Tsurumaki, Kazuyoshi, 4,695,914, Cl. 361-42.000.

Tsurumoto, Kazuo: *See*—
Ozaki, Yoshio; Tsurumoto, Kazuo; Yatomi, Takeshi; and Yamamoto, Masahiro, 4,695,696, Cl. 219-69.00P.

Tsuyuguchi, Seiichi: *See*—
Kimura, Takayoshi; Tsuyuguchi, Seiichi; and Mori, Yoshiaki, 4,695,317, Cl. 75-24.000.

Tsuzuki, Kenji; and Uotani, Takeshi, to Toyo Soda Manufacturing Co., Ltd. Process for producing phenyl chlorothioformates. 4,695,644, Cl. 558-249.000.

Tuchiya, Takanori: *See*—
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.

Tuck, Edward F.: *See*—
Morganstein, Sanford J.; Tuck, Edward F.; Mehta, Bakulesh A.; and Krakau, Herbert B., 4,696,028, Cl. 379-88.000.

Tucker, Jewell G.: *See*—
Anthony, Thomas R.; Lindner, Philip A.; and Tucker, Jewell G., 4,695,760, Cl. 313-348.000.

Tujimura, Kiyoharu: *See*—
Shimizu, Tetsuo; Tujimura, Kiyoharu; and Iwamoto, Michinori, 4,695,034, Cl. 251-129.060.

Tulpule, Bhalchandra R.; Oscarson, Edward M.; and Vosgien, David J., to United Technologies Corporation. Multi-channel clock synchronizer. 4,696,019, Cl. 375-107.000.

Tunstall, Timothy F. Golf club. 4,695,054, Cl. 273-171.000.

Tuominen, Francis W.; Maier, Helmut K.; and Howland, Warren W., to Henkel Corporation. Thickened alcoholic antimicrobial compositions. 4,695,453, Cl. 424-81.000.

Turner, Esther: *See*—
Berl, Marta N.; and Turner, Esther, 4,694,844, Cl. 132-84.00R.

Tuske, Marton: *See*—
Bordas, Barna; Gimesi, Antal; Kovacs, Magda, nee Kalman; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,309, Cl. 71-88.000.
Bordas, Barna; Gimesi, Antal; Kovacs nee Kalman, Magda; Janos, Eva; Matolcsy, Gyorgy; and Tuske, Marton, 4,695,313, Cl. 71-100.000.

Tuvell, James A.; and Smayling, Michael C., to Texas Instruments Incorporated. Modified four transistor EEPROM cell. 4,695,979, Cl. 365-185.000.

Tyler, Truman V. Self-contained hydraulically operable water purifier. 4,695,375, Cl. 210-110.000.

Tyree, Lewis, Jr., to Liquid Carbonic Corporation. Production of large quantities of CO_2 snow. 4,695,302, Cl. 62-10.000.

Tyron, Inc.: *See*—
White, Basil D., 4,694,874, Cl. 152-381.500.

Tysse, Thomas M. Oral evacuation device and method. 4,695,253, Cl. 433-136.000.

U.S.D. Corp: *See*—
Faulconer, Mark; and Greatrake, Scott E., 4,694,772, Cl. 114-315.000.

Uchida, Kihachirou, to Koito Seisakusho Co., Ltd. Waterproof lamp socket construction. 4,695,259, Cl. 439-271.000.

Uchida, Seiju: *See*—
Degawa, Toru; Fujiwara, Kozo; Hashimoto, Akio; Uchida, Seiju; Okuyama, Gen; and Matsui, Susumu, 4,695,427, Cl. 420-129.000.

Uchida, Takashi: *See*—
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.

Uchikawa, Sadao: *See*—
Aoyama, Motoo; Maruyama, Hiromi; Umegaki, Kikuo; and Uchikawa, Sadao, 4,695,425, Cl. 376-435.000.

Uchikawa, Takaaki: *See*—
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.

Uchimura, Kazumi: *See*—
Yamazaki, Yoshihide; Uchimura, Kazumi; Yamashita, Satoshi; and Takeuchi, Mikio, 4,695,614, Cl. 526-142.000.

Ueberreiter, Ekkehard. Device for conveying components particularly integrated chips, from an input magazine to an output magazine. 4,694,964, Cl. 209-549.000.

Ueda, Masahiro: *See*—
Asakura, Masahiko; Kawanabe, Tomohiko; Ueda, Masahiro; Kubota, Shinichi; Kushida, Noritaka; and Matsumoto, Yukihiro, 4,694,803, Cl. 123-440.000.

Uegaki, Masatoshi: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.

Uemura, Toshinobu; Shinooka, Kiyohide; and Kajiho, Tokuaki, to Fujisawa Pharmaceutical Co., Ltd. Sustained release tablet. 4,695,467, Cl. 424-502.000.

Ueno, Hideo; Hattori, Hiroshi; Maeda, Kumiko; and Yamada, Keiko, to Brother Kogyo Kabushiki Kaisha. Printer with display for double-width character. 4,695,172, Cl. 400-83.000.

Uesugi, Naomoto: *See*—
Ogano, Takeo; Komatsuzaki, Takeshi; Shigenari, Ryoichi; and Uesugi, Naomoto, 4,694,942, Cl. 192-13.00A.

Ulijasz, Thaddeus R.: *See*—
Ohlhaber, Ronald L.; and Ulijasz, Thaddeus R., 4,695,127, Cl. 350-96.230.

Ultra Bagger Co. of Cincinnati, The: *See*—
Maddux, Forrest E., Jr.; Eagle, Paul A.; and Robbins, Robert L., 4,694,638, Cl. 53-459.000.

Ultrasonic Arrays, Inc.: *See*—
Hossack, James M., 4,695,986, Cl. 367-140.000.

Umebayashi, Nobuhiro: *See*—
Maruyama, Hiroshi; Mizushima, Kunio; Sakemoto, Akito; and Umebayashi, Nobuhiro, 4,695,910, Cl. 360-133.000.

Umeda, Morio: *See*—
Fukutomi, Hisao; Konishi, Takeshi; Kuraoka, Koji; Umeda, Morio; Tuchiya, Takanori; and Imura, Yutaka, 4,695,089, Cl. 296-107.000.

Umegaki, Kikuo: *See*—
Aoyama, Motoo; Maruyama, Hiromi; Umegaki, Kikuo; and Uchikawa, Sadao, 4,695,425, Cl. 376-435.000.

Ungerstedt, Carl U. Dialysis probe. 4,694,832, Cl. 128-632.000.

Union Oil Company of California: *See*—
Ackelson, Donald B.; Moorehead, Eric L.; Ward, John W.; and Probst, Jon D., 4,695,365, Cl. 208-89.000.
Ho, Phillman N., 4,695,373, Cl. 208-428.000.
Hutchins, Richard D.; and Dovan, Hoai T., 4,694,906, Cl. 166-294.000.
Miller, J. Wayne; and Ward, John W., 4,695,366, Cl. 208-91.000.
Ward, John W., 4,695,368, Cl. 208-111.000.

Unisys Corporation: *See*—
Andreasen, David A.; Armstrong, John H.; Buggert, Jerrold E.; Desai, Harshad K.; Baumgardner, Stephen D.; Buckmaster, Kenneth E.; and Hussain, Zubair, 4,695,946, Cl. 364-200.000.

United DC: *See*—
Levine, Marc S., 4,695,205, Cl. 406-38.000.

United States of America
Air Force: *See*—
Yu, Francis T. S., 4,695,973, Cl. 364-822.000.
Army: *See*—
Holder, James D., 4,695,120, Cl. 350-96.110.
Mary, Donald J., 4,695,892, Cl. 358-225.000.
McDaniel, Steven G., 4,694,728, Cl. 89-1.110.
Energy: *See*—
Meek, Thomas T.; and Blake, Rodger D., 4,695,695, Cl. 219-10.55M.
Spadaro, Peter R.; Smith, Jay E.; Speer, Elmer L.; and Cecconi, Arnold L., 4,695,299, Cl. 55-274.000.
Warzinski, Robert P.; and Ruether, John A., 4,695,372, Cl. 208-311.000.
Interior: *See*—
Ackman, Terry E.; and Place, John M., 4,695,378, Cl. 210-198.100.
National Aeronautics and Space Administration: *See*—
Egli, Annmarie O.; and St. Clair, Terry L., 4,695,610, Cl. 525-426.000.
Navy: *See*—
Crane, Roger M.; and Macander, Aleksander B., 4,695,344, Cl. 156-242.000.
Koper, Kenneth T.; Willard, Sylvester L.; and Abramowski, Larry A., 4,695,520, Cl. 429-116.000.
Robbins, William L., 4,695,921, Cl. 361-308.000.

U.S. Philips Corporation: *See*—
Barbu, Stefan; Valkestijn, Leonardus; and van de Kerkhof, Franciscus A. M., 4,695,839, Cl. 340-825.060.
Bugg, Richard E. F., 4,695,835, Cl. 340-750.000.
Buikman, Dirk; Helzel, Thomas; and Roschman, Peter, 4,694,836, Cl. 128-653.000.
Clasen, Rolf, 4,695,305, Cl. 65-18.300.
Den Exter Blokland, Hendrikus B.; and van Raay, Petrus J., 4,695,135, Cl. 350-452.000.

Faessen, Louis M. H.; and Khoe, Giok D., 4,695,129, Cl. 350-96.250.
Fierens, Gustaaf E. M., 4,696,037, Cl. 381-24.000.
Gent, Derek J.; and Bergstrom, Michael, 4,695,774, Cl. 315-408.000.
Larkin, Keith J., 4,695,731, Cl. 250-374.000.
Marshall, Christopher B., 4,696,055, Cl. 455-118.000.
Pelgrom, Marcellinus J. M., 4,695,753, Cl. 307-530.000.
Raets, Hubert C., 4,695,770, Cl. 315-207.000.
Rudelle, Marie-Irene, 4,695,809, Cl. 331-117.00D.
Wagenaar, Kornelis J., 4,695,865, Cl. 357-41.000.
Ward, Rodney, 4,695,732, Cl. 250-492.200.
Zandveld, Frederik; and Visser, Jeroen M., 4,695,944, Cl. 364-200.000.
Zijlstra, Hinne, 4,695,802, Cl. 324-319.000.

United States Steel Corporation: *See*—
Rueckl, Roger L., 4,695,323, Cl. 106-85.000.

United Technologies Corporation: *See*—
Doman, Glidden S.; Kos, Joseph M.; Harner, Kermit I.; DiValentin, Eugene D.; and Healy, Henry S., 4,695,736, Cl. 290-44.000.
Howland, Gary R., 4,695,952, Cl. 364-200.000.
Marchitto, Michael J.; and Bocciarelli, Louis R., 4,695,226, Cl. 416-106.000.
Matuska, David G., 4,695,340, Cl. 156-161.000.
Matuska, David G.; and Fredenburgh, Evan A., 4,695,341, Cl. 156-161.000.
Trocciola, John C.; Powers, Joseph; and Martin, Ronald G., 4,695,518, Cl. 429-12.000.
Tulpule, Bhalchandra R.; Oscarson, Edward M.; and Vosgien, David J., 4,696,019, Cl. 375-107.000.

Univ. of Tennessee Research Corp.: *See*—
Beachey, Edwin H.; Tartar, Andre; Gras-Masse, Helene; Jolivet, Michel; Audibert, Francoise; and Chedid, Louis, 4,695,562, Cl. 514-13.000.

Universite de Rennes I: *See*—
Colin, Yves; Rosse, Gabriel; Guyader, Jean; and Laurent, Yves, 4,695,432, Cl. 422-98.000.

Universite de Sherbrooke: *See*—
Cheeke, John D. N., 4,694,699, Cl. 73-606.000.

University of California, The Regents of the: *See*—
Arakawa, Mitsuaki; Fehn, John H.; and Crooks, Lawrence E., 4,695,801, Cl. 324-318.000.
Brandes, Rolf, 4,695,798, Cl. 324-307.000.

University of Colorado Foundation: *See*—
Walba, David M.; and Razavi, Homaune A., 4,695,650, Cl. 560-109.000.

University of Florida: *See*—
Mans, Rusty J., 4,695,550, Cl. 435-194.000.

University of Miami: *See*—
Ryan, James W.; and Chung, Alfred, 4,695,577, Cl. 514-362.000.
Ryan, James W.; and Chung, Alfred, 4,695,582, Cl. 514-423.000.

University of Pittsburgh: *See*—
Cohen, Theodore; and Matz, James, 4,695,584, Cl. 514-456.000.
Sashin, Donald; and Sternglass, Ernest J., 4,696,022, Cl. 378-41.000.

University of Tennessee Research Corp., The: *See*—
Dorsett, Preston H., 4,695,537, Cl. 435-5.000.

University of Toronto Innovations Foundation: *See*—
Taylor, Kenneth W., 4,696,025, Cl. 378-146.000.

Untereker, Darrel F.: *See*—
Meyerhoff, Mark E.; Fogt, Eric J.; and Untereker, Darrel F., 4,694,834, Cl. 128-635.000.

UOP Inc.: *See*—
Chao, Tai-Hsiang; and Sachtler, J. W. A., 4,695,666, Cl. 585-481.000.
De Graff, Richard R., 4,695,665, Cl. 585-450.000.
Gattuso, Mark J.; and Ellig, Daniel L., 4,695,560, Cl. 502-222.000.
Vora, Bipin V., 4,695,662, Cl. 585-324.000.

Uotani, Takeshi: *See*—
Tsuzuki, Kenji; and Uotani, Takeshi, 4,695,644, Cl. 558-249.000.

Urano, Yoshio: *See*—
Kodama, Masahiro; Sakae, Tatsuya; and Urano, Yoshio, 4,695,967, Cl. 364-521.000.

Uratsuka, Isao: *See*—
Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, 4,695,598, Cl. 523-400.000.

Urso, Charles J., Jr., to Xerox Corporation. Charge erase device for an electrophotographic printing machine. 4,695,152, Cl. 355-3.00R.

Ury, Michael G.; and Wood, Charles H., to Fusion Systems Corporation. Method and apparatus for cooling electrodeless lamps. 4,695,757, Cl. 313-44.000.

Usbeck, Walter: *See*—
Gorner, Horst; Furstwangler, Walter; and Usbeck, Walter, 4,695,048, Cl. 271-122.000.

Ushio, Yukihide: *See*—
Kimizuka, Junichi; Ushio, Yukihide; and Seto, Kaoru, 4,695,714, Cl. 250-205.000.

USM Corp.: *See*—
Wickers, Francis A.; and Raines, Max, 4,694,766, Cl. 112-262.100.

Utsugi, Mikio, to Fuji Photo Film Co., Ltd. Video recording/reproducing camera. 4,695,905, Cl. 360-33.100.

Uuskallio, Arvo F., to Briggs & Stratton Corporation. Wet priming mechanism for an internal combustion engine. 4,694,792, Cl. 123-187.50R.

Vaal Reefs Mining and Exploration Co., Ltd.: *See*—
McGimpsey, Samuel d., 4,695,219, Cl. 414-787.000.

Vadino, Winston A.: *See*—
Hanna, Gayda; and Vadino, Winston A., 4,695,591, Cl. 514-781.000.

Valco/Valley Tool & Die, Inc.: *See*—
Eisenloeffel, Helmut, 4,694,598, Cl. 40-155.000.

Valkestijn, Leonardus: *See*—
Barbu, Stefan; Valkestijn, Leonardus; and van de Kerkhof, Franciscus A. M., 4,695,839, Cl. 340-825.060.

Valmet Oy: *See*—
Eskelinen, Pekka, 4,694,587, Cl. 34-23.000.

Van Brakel, Russel A., to Haverberg Auto Laundry Equipment Company. Tire scrubbing machine for automatic car washers. 4,694,523, Cl. 15-53.00B.

van de Kerkhof, Franciscus A. M.: *See*—
Barbu, Stefan; Valkestijn, Leonardus; and van de Kerkhof, Franciscus A. M., 4,695,839, Cl. 340-825.060.

Vandendael, Yannick: *See*—
Dehennau, Claude; and Vandendael, Yannick, 4,695,506, Cl. 428-212.000.

van der Merwe, Jacobus C.; and van der Merwe, Lucas C. Self-propelled, self-steered vehicle for power driven plant trimming tools. 4,694,577, Cl. 30-379.500.

van der Merwe, Lucas C.: *See*—
van der Merwe, Jacobus C.; and van der Merwe, Lucas C., 4,694,577, Cl. 30-379.500.

Vander Poorten, Henri, to Andromaque S.A. Electrochemical procedure for the direct forming of generally thin elements with various contours and surfaces of usual and technical ceramics or refractory material. 4,695,356, Cl. 204-180.900.

van der Put, Henk: *See*—
Steenbergen, Christiaan; Howard, Peter G.; Bracht, Roger R.; and van der Put, Henk, 4,695,994, Cl. 369-54.000.

Vanier, Noel R.; and Lum, Kin K., to Eastman Kodak Company. High molecular weight polycarbonate receiving layer used in thermal dye transfer. 4,695,286, Cl. 8-471.000.

Van Iperen, Willem H. P.; Sandt, Henry J., Jr.; and Aronson, Eric G., to Sea-Land Corporation, Inc. Refrigerated carrier floor clamp. 4,695,211, Cl. 410-77.000.

Vanlerberghe, Guy: *See*—
Kalopissis, Gregoire; and Vanlerberghe, Guy, 4,695,653, Cl. 564-505.000.

Van Offenwert, Theophilus T. J. M.: *See*—
Janssens, Frans E.; Torremans, Joseph L. G.; Hens, Jozef E.; and Van Offenwert, Theophilus T. J. M., 4,695,569, Cl. 514-258.000.

Vanore, Silvestro: *See*—
Sebastiani, Gaetano; Brandi, Roberto; Di Lena, Francesco; Vanore, Silvestro; and Carraro, Roberto, 4,695,193, Cl. 405-204.000.

van Raay, Petrus J.: *See*—
Den Exter Blokland, Hendrikus B.; and van Raay, Petrus J., 4,695,135, Cl. 350-452.000.

Van Veen, Gerardus J.: *See*—
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., 4,695,627, Cl. 540-224.000.

Varma, Ravi K.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. 7-oxabicyclo(2.2.1)heptane analogs useful as inhibitors of 5-lipoxygenase and cyclooxygenase. 4,695,585, Cl. 514-469.000.

Varma, Ravi K.; Chao, Sam T.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. 7-oxabicyclo(2.2.1)heptane-based derivatives useful as antiinflammatory, antiasthma and antipsoratic agents. 4,695,586, Cl. 514-469.000.

Vaughan, Thomas L. Hanger assembly. 4,695,025, Cl. 248-293.000.

Vaughn, Eldon D., to Spectrol Electronics Corporation. Adaptive defrost control and method. 4,694,657, Cl. 62-80.000.

Vawter, James R. Problem solving game. 4,695,257, Cl. 434-333.000.

Vazquez, Hilario, Jr.; and Yarnold, Paul R., to Bally Manufacturing Corporation. Gaming device having player selectable winning combinations. 4,695,053, Cl. 273-143.00R.

Velenyi, Louis J., to Standard Oil Company, The. Molybdenum-tungsten-containing catalyst and methane conversion process using same. 4,695,668, Cl. 585-500.000.

Velleman, Koen, to Velleman-Switch, naamloze vennootschap. Membrane for membrane switches and composing elements thereof. 4,695,681, Cl. 200-5.00A.

Velleman-Switch, naamloze vennootschap: *See*—
Velleman, Koen, 4,695,681, Cl. 200-5.00A.

Veneklasen, Lee H.; and Yagunoff, Guy G., to Perkin-Elmer Corporation, The. Field emission gun electrode geometry for improved focus stability. 4,695,773, Cl. 315-382.000.

Ventimiglia, Joseph J., to Sinclair and Rush, Inc. Dip mold and process. 4,695,241, Cl. 425-275.000.

Verbatim Corporation: *See*—
Preyaman, Vladimir, 4,695,982, Cl. 364-506.000.

Verdi, Cesare: *See*—
Delfino, Gerolamo; Franco, Simone; and Verdi, Cesare, 4,695,531, Cl. 430-513.000.

Verga, Charles F.: *See*—
Belleau, Gordon F.; Jelcin, Michael J.; and Verga, Charles F., 4,695,342, Cl. 156-173.000.

Vericom Corporation: *See*—
Bonin, Wayne A.; McCumber, Roger D.; and Teder, Rein S., 4,694,687, Cl. 73-116.000.

Verity, Philip R., to Plessey Overseas Limited. Power supplies. 4,695,937, Cl. 363-25.000.

Verner, Bo L.: *See*—
Ripl, Wilhelm K.; and Verner, Bo L., 4,695,384, Cl. 210-602.000.

Vernon, George M.: *See—*
Curro, John J.; Trusty, Alan J.; and Vernon, George M., 4,695,422, Cl. 264-504.000.
Vernon, Roger W. Vehicle tire monitoring apparatus. 4,695,823, Cl. 340-58.000.
Vertical Instruments, Inc.: *See—*
Vlakancic, Connor G.; Pereira, Ruy J.; and Goodman, Larry R., 4,694,694, Cl. 73-386.000.
Verweij, Jan; Grootveld, Herman H.; Hirs, Henri G. J.; Van Veen, Gerardus J.; Kalter, Jan; and Henniger, Peter W., to Gist-Brocades N.V. Cephalosporin deoxygenation process. 4,695,627, Cl. 540-224.000.
Vetter, Egon: *See—*
Mahalek, Josef; and Vetter, Egon, 4,695,915, Cl. 361-56.000.
Vickers, Incorporated: *See—*
Taplin, Lael B., 4,695,230, Cl. 417-218.000.
Victor Company of Japan, Ltd.: *See—*
Itonaga, Makoto; and Kayanuma, Kanji, 4,695,162, Cl. 356-369.000.
Iwahara, Makoto; Miyaji, Naotaka; and Sakamoto, Atsushi, 4,696,043, Cl. 381-92.000.
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.
Vincent, Jan G.: *See—*
Hellgren, Lars G. I.; Mohr, Viggo; and Vincent, Jan G., 4,695,457, Cl. 424-94.000.
Vincent, Ronald J., to Mechanical Technology Incorporated. Externally tuned vibration absorber. 4,694,650, Cl. 60-520.000.
Vincze, Janos: *See—*
Lacroix, Roger; Adam, Jean-Marie; and Vincze, Janos, 4,695,406, Cl. 260-372.000.
Vinogradov, Valentin A.: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.
Viohl, Uwe, to Standard Elektrik Lorenz AG. Method of producing a plane phosphor screen. 4,695,477, Cl. 427-68.000.
Visco, Gary P.: *See—*
Millham, Ernest H.; Moser, John J.; Shushereba, John J.; and Visco, Gary P., 4,696,005, Cl. 371-27.000.
Visser, Jeroen M.: *See—*
Zandveld, Frederik; and Visser, Jeroen M., 4,695,944, Cl. 364-200.000.
Vize, Robert M., to Caterpillar Inc. Vented fuel system for a vehicle. 4,694,870, Cl. 141-326.000.
Vlakancic, Connor G.; Pereira, Ruy J.; and Goodman, Larry R., to Vertical Instruments, Inc. Solid state accumulating altimeter. 4,694,694, Cl. 73-386.000.
Vock, Manfred H.: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Luccarelli, Domenick, Jr.; Miller, Kevin P.; and Vock, Manfred H., 4,695,473, Cl. 426-535.000.
Vogel Tool & Die Corporation: *See—*
Kinsley, Robert J., 4,694,718, Cl. 83-319.000.
Voigt, Reiner: *See—*
Schwabe, Peter; and Voigt, Reiner, 4,695,322, Cl. 106-35.000.
Volino, Nicholas A.: *See—*
Tallis, John R., Jr.; and Volino, Nicholas A., 4,695,735, Cl. 290-38.00R.
Volk, Heinrich; Harter, Karl; and Dotter, Fritz, to Esselte Meto International GmbH. Printed band, in particular for price marking devices. 4,694,745, Cl. 101-111.000.
Vondergoltz, G. Earl; and Hammack, Milton E., to ECI Building Components, Inc. Metal building panel with standing seam edge formations. 4,694,628, Cl. 52-528.000.
von der Wall, Klaus: *See—*
Gerloff, Klaus; Ehlert, Dieter; and von der Wall, Klaus, 4,694,873, Cl. 152-380.000.
Vora, Bipin V., to UOP Inc. Light paraffin dehydrogenation process. 4,695,662, Cl. 585-324.000.
Vosgien, David J.: *See—*
Tulpule, Bhalchandra R.; Oscarson, Edward M.; and Vosgien, David J., 4,696,019, Cl. 375-107.000.
Vsesojuzny Kardiologichesky Nauchny Tsentr Akademii Meditsinskikh Nauk SSSR: *See—*
Chazov, Evgeny I.; Smirnov, Vladimir N.; Vinogradov, Valentin A.; Titov, Mikhail I.; Penin, Vladimir A.; Giorgadze, Alexandr K.; Titova, Galina P.; Bespalova, Zhanna D.; Pekelis, Boris L.; Permyakov, Nikolai K.; Emelyanov, Sergei I.; and Dzhikia, Alexandr A., 4,695,622, Cl. 530-329.000.
W. Schlafhorst & Co.: *See—*
Langen, Manfred, 4,694,539, Cl. 19-159.00A.
Raasch, Hans, 4,695,002, Cl. 242-47.010.
Waco Trading Corporation: *See—*
Kairis, Alexandre; and Colsen, Ronnie H., 4,694,840, Cl. 128-735.000.
Wada, Hajime: *See—*
Nakayama, Noritaka; Kawakatsu, Satoshi; Katoh, Katsunori; Iijima, Toshijumi; Kumashiro, Kenji; Kashiwagi, Hiroshi; Hatta, Koichi; Uchida, Takashi; Wada, Hajime; Ishii, Fumio; Matsunaga, Satoshi; Matsubara, Yasuko; and Shinozaki, Kaoru, 4,695,533, Cl. 430-558.000.
Wada, Masahiro; and Yamaguchi, Hirohisa, to Kokusai Denshin Denwa Co., Ltd. Movement estimation system for video signals using a recursive gradient method. 4,695,882, Cl. 358-136.000.
Wada, Masaru: *See—*
Kato, Yoji; Watanabe, Seiichi; and Wada, Masaru, 4,695,862, Cl. 357-36.000.
Wafios Maschinenfabrik GmbH & Co. KG: *See—*
Rudy, Willi; and Lange, Gerhard, 4,694,644, Cl. 59-27.000.
Wagensar, Kornelis J., to U.S. Philips Corporation. Integrated logic circuit having insulated gate field effect transistors. 4,695,865, Cl. 357-41.000.
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Blagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, to Didier-Werke AG; and Didier Engineering GmbH. Catalyst for the selective reduction of nitrogen oxides in waste gases and process for the manufacture of such a catalyst. 4,695,559, Cl. 502-183.000.
Wagner, Daniel B.: *See—*
O'Connell, James P.; Piran, Uri; and Wagner, Daniel B., 4,695,554, Cl. 436-528.000.
Wagstaff, William L., to Floating Technology Company Limited, The. Handling system for effecting a submerged coupling. 4,695,191, Cl. 405-195.000.
Wakabayashi, Kouji: *See—*
Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,695,516, Cl. 428-623.000.
Wako Pure Chemical Industries, Ltd.: *See—*
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.
Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,540, Cl. 435-10.000.
Walba, David M.; and Razavi, Homaune A., to University of Colorado Foundation. Liquid crystal compounds and compositions containing same. 4,695,650, Cl. 560-109.000.
Wald, Roland J. E.: *See—*
Ekelund, Folke J. B.; Lilja, Per O.; Wald, Roland J. E.; and Stahl, Matts F., 4,695,413, Cl. 361-18.000.
Waldor, Matthew K.: *See—*
Steinman, Lawrence; Waldor, Matthew K.; Srirram, Subramanian; Herzenberg, Leonard A.; and Herzenberg, Leonore A., 4,695,459, Cl. 424-95.000.
Walgenbach, Paul J., to American Cyanamid Company. Insecticidal compositions comprising a synergistic mixture of terbufos or phorate and a pyrethroid. 4,695,564, Cl. 514-127.000.
Walker, Francis H.: *See—*
Buren, Lawrence L.; James, Donald R.; Randolph, Barney J.; Teach, Eugene G.; Tilles, Harry; and Walker, Francis H., 4,695,314, Cl. 71-100.000.
Wall, Hans J.: *See—*
Omet, Reinhard; Kindsvater, Hans; and Wall, Hans J., 4,695,796, Cl. 324-226.000.
Wallace, Norman R., to Bechtel International Corporation. Rotating connection assembly for subsea pipe connection. 4,695,189, Cl. 405-169.000.
Waller, James K., Jr. Dynamic noise reduction with logarithmic control. 4,696,044, Cl. 381-106.000.
Walston, Donald R., Jr. Blade setting tool for wood jointer/planer machines. 4,694,582, Cl. 33-635.000.
Walter, Wilhelm: *See—*
Dreschmann, Peter; and Walter, Wilhelm, 4,695,062, Cl. 277-27.000.
Wang Laboratories, Inc.: *See—*
Freudberg, Richard L.; and Garrison, Marshall B., 4,696,031, Cl. 379-386.000.
Warabisako, Terunori; Ohkura, Makoto; and Miyao, Masanobu, to Hitachi, Ltd. Semiconductor device. 4,695,856, Cl. 357-4.000.
Ward, John W., to Union Oil Company of California. Process for producing high octane gasoline. 4,695,368, Cl. 208-111.000.
Ward, John W.: *See—*
Ackelson, Donald B.; Moorehead, Eric L.; Ward, John W.; and Probst, Jon D., 4,695,365, Cl. 208-89.000.
Miller, J. Wayne; and Ward, John W., 4,695,366, Cl. 208-91.000.
Ward, Rodney, to U.S. Philips Corporation. Electron lithography apparatus. 4,695,732, Cl. 250-492.200.
Wardlaw, Stephen C.; Levine, Robert A.; Rodriguez, Rodolfo R.; and Loken, Michael R., to Becton Dickinson and Co., Inc. Method for increasing agglutination of groups of cells to produce improved cell layer interface in centrifuged blood sample using antibodies. 4,695,553, Cl. 436-177.000.
Warmwipes, Inc.: *See—*
Rose, K. Daniel; Yarbrough, Charles; and Strachan, Alan F., 4,694,973, Cl. 221-46.000.
Warner Lambert Company: *See—*
Bauer, Kurt H.; and Pins, Heinrich, 4,695,450, Cl. 424-22.000.
Yang, Robert K.; and Sharma, Shri C., 4,695,463, Cl. 424-440.000.
Warner, William B.: *See—*
Howe, Steve R.; Warner, William B.; and Shores, J. Wallace, 4,694,781, Cl. 119-156.000.
Warren, James R.: *See—*
Spells, Sherwood; Warren, James R.; and Wieck, Ronald W., 4,695,185, Cl. 404-107.000.
Warzinski, Robert P.; and Ruether, John A., to United States of America, Energy. Conditioning of carbonaceous material prior to physical beneficiation. 4,695,372, Cl. 208-311.000.

Wasserlein, Henry G., to Amp Incorporated. Electrical connector apparatus. 4,695,110, Cl. 439-289.000.

Wasson, Michael R.: *See—*
McDonald, William J.; Pittard, Gerard T.; Maurer, William C.; Wasson, Michael R.; and Herben, William C., 4,694,913, Cl. 175-61.000.

Watai, Katsunori: *See—*
Noda, Kimio; Ozeki, Kiyoshi; Furukawa, Hiroaki; and Watai, Katsunori, 4,695,730, Cl. 250-370.000.

Watanabe, Fumio; Komaki, Shojiro; Miyamoto, Masao; and Ito, Takao, to Seiko Instruments & Electronics Ltd. AC-modulation quadrupole mass spectrometer. 4,695,724, Cl. 250-292.000.

Watanabe, Hideo; and Nakajima, Nobuyoshi, to Fuji Photo Film Co., Ltd. Radiation image reproducing method and apparatus. 4,695,726, Cl. 250-327.200.

Watanabe, Hirotoshi; Makino, Osamu; and Ishida, Toru, to Matsushita Electric Industrial Co., Ltd. Thick film resistor composition. 4,695,504, Cl. 428-209.000.

Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,695,151, Cl. 355-3.00R.

Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus with document size detection. 4,695,154, Cl. 355-8.000.

Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image building apparatus. 4,695,897, Cl. 358-296.000.

Watanabe, Kiyoo: *See—*
Monno, Asao; Watanabe, Kiyoo; and Kaneko, Kazuyuki, 4,695,729, Cl. 250-358.100.

Watanabe, Koji; Okamoto, Miyoshi; Mori, Yuichi; and Noishiki, Yasuharu, to Toray Industries, Inc. Artificial vascular graft. 4,695,280, Cl. 623-1.000.

Watanabe, Makoto. Device for moulding containers. 4,695,243, Cl. 425-388.000.

Watanabe, Masakazu: *See—*
Okuno, Akiyasu; Watanabe, Masakazu; and Ikoma, Kazuhiko, 4,695,517, Cl. 428-698.000.

Watanabe, Osamu: *See—*
Konagaya, Shigeji; Watanabe, Osamu; Kuzumoto, Hideshi; Tokai, Masaya; Narusawa, Haruhiko; and Kato, Yasuo, 4,695,383, Cl. 210-500.370.

Watanabe, Seiichi: *See—*
Kato, Yoji; Watanabe, Seiichi; and Wada, Masaru, 4,695,862, Cl. 357-36.000.

Watanabe, Yoshihiro: *See—*
Nishino, Atsushi; Ikeda, Masaki; Watanabe, Yoshihiro; and Hiraka, Masahiro, 4,694,573, Cl. 29-846.000.

Wataya, Seiji; Shimomura, Setsuhiro; and Nishimura, Yukinobu, to Mitsubishi Denki Kabushiki Kaisha. Fuel control apparatus for engine. 4,694,806, Cl. 123-494.000.

Waterman, John K., to Raytheon Company. Traveling wave tube and its method of construction. 4,695,766, Cl. 315-3.500.

Watt, Brian J.; Bhula, Dilipkumar N.; and Birdy, Jal N., to Chevron Research Company. Elastomeric seal for a removable bottom founded structure. 4,695,197, Cl. 405-224.000.

Wausau Metals Corporation: *See—*
Rawlings, Kirk A., 4,694,546, Cl. 29-81.00D.

Wazaki, Yoshio: *See—*
Yatabe, Fumio; and Wazaki, Yoshio, 4,694,805, Cl. 123-489.000.

Wean Industries, Inc.: *See—*
Boshold, Raymond F., 4,694,673, Cl. 72-272.000.

Weber, Walter: *See—*
Schauwecker, Friedrich; and Weber, Walter, 4,695,928, Cl. 362-61.000.

Wedler, Hartmut: *See—*
Wolff, Pieter; and Wedler, Hartmut, 4,695,974, Cl. 364-900.000.

Weidner, Frank: *See—*
Susse, Karl-Ernst; and Weidner, Frank, 4,696,009, Cl. 372-25.000.

Weinberger, Bernd: *See—*
Suhr, Heinz-Peter; and Weinberger, Bernd, 4,695,093, Cl. 297-300.000.

Weinblatt, Lee S. Television viewer meter. 4,695,879, Cl. 358-84.000.

Weiner, Brian C.; and Weiner, Sarah H. Inflatable gastric device for treating obesity and method of using the same. 4,694,827, Cl. 128-303.00R.

Weiner, Sarah H.: *See—*
Weiner, Brian C.; and Weiner, Sarah H., 4,694,827, Cl. 128-303.00R.

Weinhold, Karl. Device for connecting the ends of two pipes. 4,695,079, Cl. 285-278.000.

Weis, Ronald J.: *See—*
Astrom, Gordon L.; Weis, Ronald J.; and Shubert, Wesley M., 4,695,376, Cl. 210-122.000.

Weise, Jeanne: *See—*
Mastriani, Dennis; Jacoby, Donald; Weise, Jeanne; Linick, Bruce; Marinho, John; and DeSantis, Charles M., 4,696,053, Cl. 455-67.000.

Weiswurm, Klaus D. Method and apparatus for coating of circuit boards. 4,695,482, Cl. 427-96.000.

Wendt, David L., to SSI Technologies, Inc. Exhaust gas recirculation valve having integral electronic control. 4,694,812, Cl. 123-571.000.

Wendt, Peter, to Siemens Aktiengesellschaft. Circuit arrangement for protection against surge voltages for a repeater. 4,695,919, Cl. 361-110.000.

Wesenberg, Donald L.: *See—*
Russell, Michael K.; Wesenberg, Donald L.; and Leaney, Peter A., 4,694,555, Cl. 29-451.000.

West Electric Company, Ltd.: *See—*
Makino, Hiroshi; Yoshino, Tsunemi; Kihara, Tadaharu; and Takashima, Akira, 4,695,893, Cl. 358-227.000.
Yoshino, Tsunemi; Ishikawa, Katsuji; and Iwata, Hiroshi, 4,695,144, Cl. 354-195.110.

West, Theodore H., to Exxon Research and Engineering Company. Wax crystal modification using dewaxing aids under agitated conditions. 4,695,363, Cl. 208-33.000.

Western Extrusions Corporation: *See—*
Pruden, Charles W.; McEvoy, Alfred P.; and McEvoy, Charles S., 4,694,612, Cl. 49-445.000.

Western Gear Corporation: *See—*
Mourani, George D., 4,695,014, Cl. 244-213.000.

Westfalia Separator AG: *See—*
Zettler, Karl-Heinz, 4,695,270, Cl. 494-34.000.

Westinghouse Electric Corp.: *See—*
Feild, Alexander L., Jr., 4,695,476, Cl. 427-6.000.
Flynn, William M., 4,695,424, Cl. 376-272.000.
Gerlowski, Thomas J., 4,694,693, Cl. 73-168.000.
Lahoda, Edward J.; Burgman, Herbert A.; and Kwon, Young J., 4,695,441, Cl. 423-347.000.
Shero, David J.; and Dadpey, Habib, 4,695,783, Cl. 318-808.000.
Taft, Jeffrey D., 4,695,156, Cl. 356-1.000.

Westphal, Dean W.; and Strohbeen, David T., to Kimberly-Clark Corporation. Apparatus and method for simultaneously inverting, folding and pleating. 4,694,978, Cl. 223-28.000.

Westvaco Corporation: *See—*
Forbes, Hampton E., Jr., 4,694,987, Cl. 229-114.000.

Wetter, Hansjurg: *See—*
Oertle, Konrad; and Wetter, Hansjurg, 4,695,643, Cl. 556-428.000.

Whirlpool Corporation: *See—*
Tate, Ralph, Jr.; and Woods, John T., 4,694,553, Cl. 29-445.000.

White, Basil D., to Tyron, Inc. Wheel well obstructor for a wheel rim. 4,694,874, Cl. 152-381.500.

White, Donald M., III: *See—*
Thorud, Richard A.; and White, Donald M., III, 4,694,594, Cl. 37-244.000.

White, Malcolm J.: *See—*
Bellingham, Ronald S.; and White, Malcolm J., 4,694,666, Cl. 70-16.000.

White, William J.: *See—*
Paine, Christopher G.; White, William J.; and Resnick, Susan J., 4,695,861, Cl. 357-30.000.

Whitehead, Roy A.: *See—*
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,392, Cl. 252-62.540.
Chagnon, Mark S.; Groman, Ernest V.; Josephson, Lee; and Whitehead, Roy A., 4,695,393, Cl. 252-62.540.

Whitener, Gary, to Trim-Lok, Inc. Beading profile strip. 4,695,499, Cl. 428-122.000.

Whittle, Leslie F., to Badger Company, Inc., The. Method of recovering heat from low temperature effluent. 4,695,664, Cl. 585-440.000.

Whittle, Rex W. J., to Astec Components, Ltd. Switching mode power supply start circuit. 4,695,936, Cl. 363-21.000.

Wichelhaus, Winfried: *See—*
Rossmann, Christian; Fluechter, Horst; Schreiber, Gerald; and Wichelhaus, Winfried, 4,695,396, Cl. 252-135.000.

Wickers, Francis A.; and Raines, Max, to USM Corp. Method and apparatus for registering and clamping large workpieces. 4,694,766, Cl. 112-262.100.

Widder, Rudi: *See—*
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Wide-Lite International: *See—*
Schweickardt, Karl, 4,695,769, Cl. 315-158.000.

Wieck, Ronald W.: *See—*
Spells, Sherwood; Warren, James R.; and Wieck, Ronald W., 4,695,185, Cl. 404-107.000.

Wiedemer, John D., to Signal Security Technologies. High security pay television system. 4,696,034, Cl. 380-16.000.

Wielinga, Rudolf: *See—*
Bos, Jacobus J.; Cuperus, Rinze; and Wielinga, Rudolf, 4,695,628, Cl. 540-312.000.

Wiemeyer, Benno: *See—*
Dreyer, Heinz; Scheufler, Bernd; Wiemeyer, Benno; and Luhrmann, Johannes, 4,694,759, Cl. 111-85.000.

Wiener, Bruce A.: *See—*
Simonette, Dallas W.; and Wiener, Bruce A., 4,695,176, Cl. 401-144.000.

Wierzbicki, Julian J.; and Chakrabarti, Kirti B., to GTE Products Corporation. Infrared floodlight assembly. 4,695,930, Cl. 362-293.000.

Wijayarthna, Bandula; and Newman, Glenn E., to Mallinckrodt, Inc.; and Duke University. Loop coronary catheter. 4,694,838, Cl. 128-658.000.

Wilder, Martin S., to Centerchem, Inc.; and Pentapharm AG. Method for alleviating skin irritation by formulations containing superoxide dismutase. 4,695,456, Cl. 424-94.500.

Willard, Sylvester L.: *See—*
Koper, Kenneth T.; Willard, Sylvester L.; and Abramowski, Larry A., 4,695,520, Cl. 429-116.000.

Willey, Robert P. Wheeled article carrier. 4,695,067, Cl. 280-47.220.

William Prym-Werke GmbH. & Co. KG: *See—*
Altwicker, Gerhard H. J., 4,694,984, Cl. 227-18.000.

Williams, David E.; and Hoyt, Edwin D., to Amark Industries, Inc. Flexible blanket heater. 4,695,703, Cl. 219-212.000.

Williams, Jeffrey A.: *See*—
Dicke, Grant D.; and Williams, Jeffrey A., 4,694,601, Cl. 40-610.000.

Williams, Rodney K.: *See*—
Heikkila, Kurt E.; Williams, Rodney K.; and Pylkki, Russell J., 4,694,682, Cl. 73-61.10C.

Wilmot, Daniel. Energy management system. 4,695,738, Cl. 307-31.000.

Wilwerding, Dennis J., to Honeywell Inc. Apparatus and method for opto-electronic package. 4,695,719, Cl. 250-216.000.

Wingler, William C.; and Pomponio, Edward V., to Telechron, Inc. Electric appliance timer with automatic turn off. 4,695,683, Cl. 200-38.00R.

Winkelmann, Manfred; Rothfuss, Hans; Muschner, Udo; and Schmitt, Karl H., to Didier-Werke AG. Gas scavenging apparatus for metallurgical vessels. 4,695,043, Cl. 266-265.000.

Winogrocki, Ray F. Seat switch. 4,695,682, Cl. 200-5.00R.

Winters, Scot L.: *See*—
Grawey, Charles E.; and Winters, Scot L., 4,695,420, Cl. 264-265.000.

Witte, Johannes: *See*—
Heidemann, Gerhard; and Witte, Johannes, 4,694,917, Cl. 175-299.000.

Wittlinger, Gerhard, to Wuerttembergische Metallwarenfabrik AG. Coffee percolator. 4,694,737, Cl. 99-279.000.

Wittmann, Horst, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH. Single-ended fluorescent lamp-base combination. 4,695,767, Cl. 315-58.000.

Wohlhieter, George M.: *See*—
Rudolph, John M.; and Wohlhieter, George M., 4,694,570, Cl. 29-740.000.

Wohrl, Bernhard, to Motoren-und Turbinen-Union Munchen GmbH. Apparatus for securing a component exposed to elevated temperature to a thermally insulated wall. 4,694,895, Cl. 165-136.000.

Wolcott, Dana W., to Eastman Kodak Company. Color video printer includes a color viewer and image adjustment controls which are inhibited during exposure. 4,695,902, Cl. 358-332.000.

Wolf, Helmut: *See*—
Balzer, Wolf-Dieter; Bechtolsheimer, Hans-Heinrich; Beyer, Karl-Heinz; Fikentscher, Rolf; Perner, Johannes; Widder, Rudi; and Wolf, Helmut, 4,695,412, Cl. 260-507.00R.

Wolf, Horst, to Zinser Textilmaschinen GmbH. Spinning or twisting machine. 4,694,643, Cl. 57-100.000.

Wolff, Pieter; and Wedler, Hartmut, to Siemens Aktiengesellschaft. Circuit arrangement for receiving and/or transmitting binary signals serially appearing on the plurality of lines to and from a processing device containing a micro-computer or microprocessor. 4,695,974, Cl. 364-900.000.

Wolford, Otis, Jr.; and Wolford, Richard P. Tool for wrapping drop wires for suspended grid ceiling. 4,694,869, Cl. 140-119.000.

Wolford, Richard P.: *See*—
Wolford, Otis, Jr.; and Wolford, Richard P., 4,694,869, Cl. 140-119.000.

Wolfram, Leszek J.: *See*—
Chung-Bong-Chan, Alexander; and Wolfram, Leszek J., 4,695,285, Cl. 8-429.000.

Wolverine World Wide, Inc.: *See*—
Banich, Howard P.; and Norton, Daniel E., 4,694,591, Cl. 36-102.000.

Wondergem, Anthony L., to Development Finance Corporation. Pressure regulator. 4,695,101, Cl. 303-117.000.

Wood, Charles H.: *See*—
Ury, Michael G.; and Wood, Charles H., 4,695,757, Cl. 313-44.000.

Wood, Donald C.; and Wood, James D. Seeding process and apparatus. 4,694,606, Cl. 47-56.000.

Wood, James D.: *See*—
Wood, Donald C.; and Wood, James D., 4,694,606, Cl. 47-56.000.

Wood, John F. B.; Kaiser, Timothy D.; Allyn, Jerome B.; Dykes, Charles D.; Kalaskie, Frank E.; Carmichael, Robert J.; and Simon, Charles R., to Hazelett Strip-Casting Corporation. Edge dam synchronization and tensioning control method and system for the shaping and profiling of continuously cast metal sections by means of a continuous casting machine. 4,694,899, Cl. 164-452.000.

Wood, Ronald E.: *See*—
Sparling, Kenneth P.; Incardona, Angelo; Kikendall, Garth D.; Richardson, David G.; Wood, Ronald E.; and Bakow, Leon, 4,695,213, Cl. 411-506.000.

Wood, Ruey E., Jr., to TRW Inc. Ball joint with mechanical interlock. 4,695,182, Cl. 403-140.000.

Woodard, Kenneth E., Jr.; Dean, Robert A.; Fair, David L.; and Fister, Julius C., Jr., to Olin Corporation. Filter press membrane electrolytic cell with diffusion bonded electrode elements and elastomeric frames. 4,695,359, Cl. 204-255.000.

Wooden, Gene R.: *See*—
Hill, James D.; and Wooden, Gene R., 4,695,694, Cl. 219-10.55D.

Woods, James A., to Harold R. Lauterbach. Gravitometer prover. 4,694,679, Cl. 73-1.00R.

Woods, John T.: *See*—
Tate, Ralph, Jr.; and Woods, John T., 4,694,553, Cl. 29-445.000.

Wool Development International, Ltd.: *See*—
Gibson, Jame D. M., 4,695,485, Cl. 427-256.000.

Worack, Stephen A. Slow motion actuating device. 4,695,016, Cl. 246-415.00A.

Wozniczka, George, to Zenith Electronics Corporation. Two piece heat sink with serrated coupling. 4,695,924, Cl. 361-386.000.

Wright, Joseph W.: *See*—
Ritzman, Ira G.; and Wright, Joseph W., 4,695,775, Cl. 315-410.000.

Wu, Marinda L.: *See*—
Dorman, Linneaus C.; Meyer, Victor E.; and Wu, Marinda L., 4,695,295, Cl. 55-16.000.

Wuerttembergische Metallwarenfabrik AG: *See*—
Wittlinger, Gerhard, 4,694,737, Cl. 99-279.000.

Wunderlich, Egmar: *See*—
Wagener, Dietrich; Laue, Karl H.; Wunderlich, Egmar; Sander, Theo; Flockenhaus, Claus; Hackler, Erich; Levkov, Biagoje; Grimm, Daniel; Kainer, Hartmut; Stein, Hermann; Buhler, Hans-Eugen; Kalfa, Horst; Jansen, Johann; Stender, Werner; and Max, Arnold, 4,695,559, Cl. 502-183.000.

Wunsche, Peter: *See*—
Bilek, Andreas; and Wunsche, Peter, 4,694,786, Cl. 123-73.0AD.

Wuthrich, Peter: *See*—
Mayor, Jean-Michel; Steffen, Jurg; and Wuthrich, Peter, 4,695,698, Cl. 219-121.00L.

Wycech, Joseph S., to General Motors Corporation. Method of reinforcing a structural member. 4,695,343, Cl. 156-196.000.

Wyndham, Ronald; Chaplin, Gervaise M.; and Swanson, William M., to Toth Aluminum Corporation. Process for manufacturing high purity metal chlorides. 4,695,436, Cl. 423-135.000.

Xerox Corporation: *See*—
Knapp, John F.; Gruber, Robert J.; Floyd, Lawrence, Jr.; Bolte, Steven B.; and Swales, Michael G., 4,695,524, Cl. 430-32.000.
Tandon, Jagdish C.; and Araghi, Mehdi N., 4,695,716, Cl. 250-211.00R.
Urso, Charles J., Jr., 4,695,152, Cl. 355-3.00R.

Xilinx, Inc.: *See*—
Carter, William S., 4,695,740, Cl. 307-242.000.

Yagi, Misao: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Yagi, Shizuo; Hirosawa, Yoshiaki; Kawai, Makoto; and Fujii, Isao, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing control system for internal combustion engines. 4,694,799, Cl. 123-425.000.

Yagi, Yoshio: *See*—
Gojo, Tomomi; Yagi, Yoshio; and Izumi, Tsunetada, 4,695,834, Cl. 340-734.000.

Yagii, Koji; Miyata, Jun; and Takasuga, Shunzo, to Mazda Motor Corporation. Method of making composite member. 4,695,699, Cl. 219-121.0LD.

Yagunoff, Guy G.: *See*—
Veneklasen, Lee H.; and Yagunoff, Guy G., 4,695,773, Cl. 315-382.000.

Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, to Shin Nisso Kako Co., Ltd. Addition compound of fluoran compounds and ketone. 4,695,640, Cl. 549-226.000.

Yale University: *See*—
Pawelek, John M., 4,695,449, Cl. 424-1.100.

Yamada, Keiko: *See*—
Ueno, Hideo; Hattori, Hiroshi; Maeda, Kumiko; and Yamada, Keiko, 4,695,172, Cl. 400-83.000.

Yamada, Seiji: *See*—
Naito, Kazufumi; Haze, Setsuo; Nobutugu, Hideo; Nakagawa, Yukio; Yamada, Seiji; and Murata, Shuji, 4,694,920, Cl. 177-25.000.

Yamada, Yasuyuki: *See*—
Nakayama, Hiroki; Sato, Yasuhisa; and Yamada, Yasuyuki, 4,695,134, Cl. 350-432.000.

Yamagata, Shinji: *See*—
Matsumoto Yoshiaki; Yamagata, Shinji; and Sugihara, Kazuyoshi, 4,695,814, Cl. 337-77.000.

Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, to Shimizu Kensetsu Kabushiki Kaisha. Clean room. 4,694,736, Cl. 98-31.600.

Yamagata, Tsuneaki: *See*—
Otsuka, Seinosuke; Tani, Kazuhide; Yamagata, Tsuneaki; Akutagawa, Susumu; Kumobayashi, Hidenori; and Yagi, Misao, 4,695,631, Cl. 544-170.000.

Yamagishi, Tooru: *See*—
Shinyagaito, Tatsuya; Kuramoto, Terumasa; Machida, Toyotaka; Saito, Kikuji; Shichijo, Shunichi; Yamagishi, Tooru; Kobayashi, Yoshinao; Ishii, Kazuyoshi; and Hirata, Atsumi, 4,695,904, Cl. 358-342.000.

Yamaguchi, Hirohisa: *See*—
Wada, Masahiro; and Yamaguchi, Hirohisa, 4,695,882, Cl. 358-136.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Furukawa, Naoki, 4,695,822, Cl. 340-53.000.

Yamamoto, Haruo, to Casio Computer Co., Ltd. Electronic apparatus for entering pattern data by finger activation. 4,695,828, Cl. 340-365.00S.

Yamamoto, Hiraku; Suzuki, Toshimichi; Katayama, Shigeru; Uratsuka, Isao; and Asoshina, Eishi, to Nitto Electric Industrial Co., Ltd. Epoxy resin coating composition. 4,695,598, Cl. 523-400.000.

Yamamoto, Hiromi; Imai, Miho; and Suzuki, Noboru, to Kao Corporation. Hairbrush. 4,694,525, Cl. 15-160.000.

Yamamoto, Kanshi: *See*—
Hojo, Takeshi; Kawada, Shin-Ichi; Fukano, Michio; Yamamoto, Kanshi; Okamura, Youji; Sato, Kazuteru; Saito, Masahiko; and Hane, Fuyuki, 4,694,696, Cl. 73-497.000.

Yamamoto, Koichi: *See*—
Kikuchi, Toshiyuki; and Yamamoto, Koichi, 4,694,709, Cl. 74-866.000.

Yamamoto, Masahiro: *See*—
Ozaki, Yoshio; Tsurumoto, Kazuo; Yatomi, Takeshi; and Yamamoto, Masahiro, 4,695,696, Cl. 219-69.00P.
Yamamoto, Norio: *See*—
Suzuki, Yasushi; Hasegawa, Yukio; Sato, Michitaka; Saito, Morinobu; Yamamoto, Norio; Miyasaka, Katsuhiko; Mikami, Takashi; and Miyazawa, Katsuhiko, 4,695,581, Cl. 514-415.000.
Yamamoto, Shinichi: *See*—
Yamagata, Taizo; Uchikawa, Takaaki; Yamamoto, Shinichi; Tomikawa, Shinichiro; Ogasahara, Yoshio; and Sukagawa, Masaru, 4,694,736, Cl. 98-31.600.
Yamamoto, Tetsuhiro: *See*—
Fujio, Masaaki; and Yamamoto, Tetsuhiro, 4,694,633, Cl. 53-49.000.
Yamamoto, Yuuichi, to Mitsubishi Denki Kabushiki Kaisha. Electric lead device for superconducting electric apparatus. 4,695,675, Cl. 174-15.0CA.
Yamane, Yasukuni: *See*—
Takakura, Masaki; Noguchi, Yoji; Yamane, Yasukuni; and Kako, Noritoshi, 4,695,966, Cl. 364-521.000.
Yamanishi, Eiichi, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,695,896, Cl. 358-296.000.
Yamaninhi, Kazuhiko; and Hanada, Toshiro, to Wako Pure Chemical Industries, Ltd. Quantitative determination of substrate treated with oxidase. 4,695,540, Cl. 435-10.000.
Yamanishi, Kazuhiko: *See*—
Sakata, Yoshitsugu; Miyashita, Yoshibonu; Hamanaka, Tadashi; Kodera, Hiroyuki; Miki, Yutaka; Yamanishi, Kazuhiko; and Hanada, Toshiro, 4,695,539, Cl. 435-10.000.
Yamasaki, Kimiyoshi: *See*—
Enoki, Takatomo; Yamasaki, Kimiyoshi; and Ohwada, Kuniki, 4,694,564, Cl. 437-40.000.
Yamasaki, Yasuo: *See*—
Sumitani, Koji; Sakai, Tokuji; Yamasaki, Yasuo; and Onodera, Tamio, 4,695,667, Cl. 585-481.000.
Yamashita, Kiyoshi; Aoshima, Terutaka; Narita, Ryuuho; and Imai, Masahiro, to Kabushiki Kaisha Toshiba. Electric rice cooker with timer having plural memory areas. 4,695,710, Cl. 219-506.000.
Yamashita, Masatoshi; and Tsunoda, Norio, to Fuji Jukogyo Kabushiki Kaisha. Hit indicating system in towed target for aerial firing practice. 4,695,059, Cl. 273-360.000.
Yamashita, Satoshi: *See*—
Yamazaki, Yoshihide; Uchimura, Kazumi; Yamashita, Satoshi; and Takeuchi, Mikio, 4,695,614, Cl. 526-142.000.
Yamashita, Toshiyuki: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.
Yamauchi, Nobuhiro: *See*—
Yukimoto, Kazuyoshi; Fukura, Kenichi; and Yamauchi, Nobuhiro, 4,695,036, Cl. 254-126.000.
Yamaura, Mitsuru; and Fujisawa, Norio, to Kabushiki Kaisha Toshiba. Voltage/frequency converter with frequency drift compensation loop. 4,695,931, Cl. 363-8.000.
Yamayoshi, Kazuo: *See*—
Masuhara, Kenichi; Yamayoshi, Kazuo; and Wakabayashi, Kouji, 4,695,516, Cl. 428-623.000.
Yamazaki, Tsutomu: *See*—
Kato, Masaki; and Yamazaki, Tsutomu, 4,694,798, Cl. 123-339.000.
Yamazaki, Yoshihide; Uchimura, Kazumi; Yamashita, Satoshi; and Takeuchi, Mikio, to Japan Synthetic Rubber Co., Ltd. Process for producing an olefin copolymer rubber. 4,695,614, Cl. 526-142.000.
Yanada, Shigeo: *See*—
Masumoto, Mituhiko; Yanada, Shigeo; and Kinugawa, Tadami, 4,695,620, Cl. 528-204.000.
Yanagihara, Toshio: *See*—
Amano, Itaru; Fujieda, Yasuhiko; Ichikawa, Katsumi; Kanzawa, Masahide; Yanagihara, Toshio; and Misumi, Shikao, 4,695,234, Cl. 425-23.000.
Yang, Chen-Hsyong: *See*—
Lynch, Gary J.; and Yang, Chen-Hsyong, 4,695,410, Cl. 260-410.500.
Yang, Robert K.; and Sharma, Shri C., to Warner-Lambert Company. Delivery system for active ingredients and preparation thereof. 4,695,463, Cl. 424-440.000.
Yang, Tai-Her. Adjustable wrench. 4,694,711, Cl. 81-57.500.
Yankoff, Gerald K. Tool holder. 4,695,208, Cl. 407-106.000.
Yao, Samuel S.: *See*—
Head, Robert E.; and Yao, Samuel S., 4,695,227, Cl. 416-134.00A.
Yarbrough, Charles: *See*—
Rose, K. Daniel; Yarbrough, Charles; and Strachan, Alan F., 4,694,973, Cl. 221-46.000.
Yardley, Alfred; and Pickering, John F., to Lucas Industries Limited. Brake master cylinder. 4,694,651, Cl. 60-578.000.
Yarnold, Paul R.: *See*—
Vazquez, Hilario, Jr.; and Yarnold, Paul R., 4,695,053, Cl. 273-143.00R.
Yatabe, Fumio; and Wazaki, Yoshio, to Honda Giken Kogyo K.K. Air-fuel ratio control method for internal combustion engines. 4,694,805, Cl. 123-489.000.
Yates, Kenneth H., to Sargent Oil Well Equipment Company of Dover Resources, Incorporated. Motor protection system and process. 4,695,779, Cl. 318-484.000.
Yatomi, Takeshi: *See*—
Ozaki, Yoshio; Tsurumoto, Kazuo; Yatomi, Takeshi; and Yamamoto, Masahiro, 4,695,696, Cl. 219-69.00P.
Yeager, Patrick F.: *See*—
Ney, Reuben E.; Pass, Raymond V.; and Yeager, Patrick F., 4,695,105, Cl. 439-95.000.
Yla-Hemmila, Veikko: *See*—
Aalto, Erkki; and Yla-Hemmila, Veikko, 4,694,851, Cl. 137-499.000.
Yli-Vakkuri, Erkki P. J.: *See*—
Reunamaki, Pauli T.; Yli-Vakkuri, Erkki P. J.; and Anttonen, Kauko K., 4,695,821, Cl. 338-316.000.
Yokobori, Nobuyoshi: *See*—
Inaji, Toshio; Okamoto, Hiroshi; and Yokobori, Nobuyoshi, 4,695,907, Cl. 360-107.000.
Yokogawa Medical Systems, Limited: *See*—
Takeuchi, Yasuhito; Hirota, Yuichi; Sano, Shinichi; and Ishiguro, Shinichi, 4,694,680, Cl. 73-1.0DV.
Yokohama Rubber Co., Ltd., The: *See*—
Kageyama, Kunio; and Takasugi, Sumio, 4,695,508, Cl. 428-261.000.
Yokoo, Koji: *See*—
Inoue, Yoshio; Arai, Masatoshi; Sato, Shinichi; and Yokoo, Koji, 4,695,617, Cl. 528-32.000.
Yokota, Takashi; Lee, Frank; Rennick, Donna; and Arai, Ken-ichi, to DNAX Research Institute of Molecular and Cellular Biology, Inc. cDNA clones coding for polypeptides exhibiting multi-lineage cellular growth factor activity. 4,695,542, Cl. 435-68.000.
Yong-Hung, Lin: *See*—
Kuo-Ching, Huang; and Yong-Hung, Lin, 4,694,866, Cl. 139-13.00R.
Yoritsune, Osamu: *See*—
Takeuchi, Hideo; Kobayashi, Michiaki; Yoritsune, Osamu; and Matsumoto, Takemasa, 4,694,749, Cl. 101-426.000.
Yoshida, Hitoshi: *See*—
Okajima, Atushi; Yoshida, Hitoshi; Takeuchi, Yukihisa; and Fukutani, Masanori, 4,695,301, Cl. 55-523.000.
Yoshida, Kanji: *See*—
Setsuie, Takashi; Otani, Takeji; and Yoshida, Kanji, 4,695,415, Cl. 264-29.200.
Yoshida, Kazuhiro, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic circuit system for use in hydraulically operated vehicles. 4,694,647, Cl. 60-442.000.
Yoshida Kogyo K.K.: *See*—
Ishida, Takao; Yoshida, Yukio; and Ohno, Kenzo, 4,694,607, Cl. 49-25.000.
Yoshida, Masahiro; and Inumaru, Susumu, to Sumitomo Light Metal Industries, Ltd. Electromagnetic levitation casting. 4,694,888, Cl. 164-467.000.
Yoshida, Tsuneaki: *See*—
Takanohashi, Kunio; Yoshida, Tsuneaki; and Fujii, Shoichiro, 4,695,639, Cl. 548-165.000.
Yoshida, Yukio: *See*—
Ishida, Takao; Yoshida, Yukio; and Ohno, Kenzo, 4,694,607, Cl. 49-25.000.
Yoshikawa, Takahiro: *See*—
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, 4,695,175, Cl. 400-196.100.
Yoshimoto, Itsuro: *See*—
Shinohara, Isao; and Yoshimoto, Itsuro, 4,694,723, Cl. 84-1.030.
Yoshimura, Kunimasa: *See*—
Nishida, Minoru; Hattori, Tadashi; Yoshimura, Kunimasa; and Muraki, Tetsuzo, 4,695,758, Cl. 313-130.000.
Yoshimura, Masakatsu: *See*—
Kotera, Norio; Uegaki, Masatoshi; Yoshimura, Masakatsu; Masaki, Shinzaburo; Kaneoya, Tatsuo; Miyaoka, Takashi; Maegawa, Yuzo; and Fukasawa, Akira, 4,695,407, Cl. 760-378.000.
Yoshimura, Shouji: *See*—
Miyoshi, Kiyotada; Tsuboi, Noboru; Nishitani, Kunihiko; Kubo, Kazuo; and Yoshimura, Shouji, 4,695,233, Cl. 418-83.000.
Yoshinaka, Shinji: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yoshinaka, Shinji; Kinoshita, Kimiaki; Saito, Morikuni; Yamashita, Toshiyuki; and Nanbu, Morio, 4,695,640, Cl. 549-226.000.
Yoshino, Tsunemi; Ishikawa, Katsuji; and Iwata, Hiroshi, to West Electric Company, Ltd. Drive apparatus of lens and exposure mechanism by motor. 4,695,144, Cl. 354-195.110.
Yoshino, Tsunemi: *See*—
Makino, Hiroshi; Yoshino, Tsunemi; Kihara, Tadaharu; and Takashima, Akira, 4,695,893, Cl. 358-227.000.
Yoshioka, Michihiko: *See*—
Shirai, Hideaki; Chiba, Kimio; Okawa, Koji; Ishibashi, Hiroshi; Ishii, Akihiro; Itoh, Hirotaka; Kuzushita, Hirokazu; Yoshioka, Michihiko; and Hirose, Michio, 4,695,515, Cl. 428-458.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Magami, Masato; Saeki, Kazumi; Miura, Takanori; and Inoue, Takeshi, 4,695,649, Cl. 560-86.000.
Yoshizawa, Takeshi, to Fujitsu Limited. Mask washing apparatus for production of integrated circuit. 4,694,527, Cl. 15-308.000.
Young, David N., to Keneticon Limited. Heating oven. 4,695,707, Cl. 219-392.000.
Young, Marilyn M. Neck and facial lift band assembly. 4,694,823, Cl. 128-76.00B.
Yu, Francis T. S., to United States of America, Air Force. Real-time programmable optical correlator. 4,695,973, Cl. 364-822.000.
Yuergens, Kenneth C.: *See*—
Hall, David A.; and Yuergens, Kenneth C., 4,694,941, Cl. 192-3.280.

Yuhaku, Satoru: *See*—
Nishimura, Tsutomu; Nakatani, Seiichi; Yuhaku, Satoru; and Ishida, Toru, 4,695,403, Cl. 252-513.000.

Yuhas, Robert J.: *See*—
Ruth, Dale G.; and Yuhas, Robert J., 4,695,677, Cl. 194-45.0TD.

Yukimoto, Kazuyoshi; Fukura, Kenichi; and Yamauchi, Nobuhiro, to Aisin Seiki Kabushiki Kaisha. Screw bar for a pantograph-type jack. 4,695,036, Cl. 254-126.000.

Zaehringer, Edmund; Baker, Peotr; and Zettel, Rolf, to ITT Industries, Inc. Digital FM detector for digitized FM signals. 4,696,018, Cl. 375-82.000.

Zandel, Adam: *See*—
Zeitlin, Alexander; and Zandel, Adam, 4,694,678, Cl. 72-455.000.

Zandveld, Frederik; and Visser, Jeroen M., to U.S. Philips Corporation. Computer system comprising a data, address and control signal bus which comprises a left bus and a right bus. 4,695,944, Cl. 364-200.000.

Zarate, Humberto T., to Dianalog Systems, Inc. Analog computer variable duty modulator. 4,694,890, Cl. 165-12.000.

Zarkovacki, John: *See*—
Lukich, James L.; and Zarkovacki, John, 4,694,518, Cl. 5-136.000.

Zarnoch, Kenneth P.; and Iacovangelo, Charles D., to General Electric Company. Electroless nickel plating composition and method. 4,695,489, Cl. 427-438.000.

Zay, John. Coin counter and wrapper and method of counting and wrapping coins. 4,694,845, Cl. 453-59.000.

Zeevi, Yehoshua Y.: *See*—
Medina, Antonio; and Zeevi, Yehoshua Y., 4,695,130, Cl. 350-132.000.

Zeitlin, Alexander; and Zandel, Adam, to Press Technology Corporation. Tie-rods fabricated of composite materials for forging presses. 4,694,678, Cl. 72-455.000.

Zemco Group, Inc.: *See*—
Blaney, Peter G., 4,694,583, Cl. 33-361.000.

Zenith Electonics Corporation: *See*—
Palac, Kazimir, 4,695,523, Cl. 430-23.000.

Zenith Electronics Corporation: *See*—
Fendley, James R., 4,695,761, Cl. 313-407.000.
Wozniczka, George, 4,695,924, Cl. 361-386.000.

Zettel, Rolf: *See*—
Zaehringer, Edmund; Baker, Peotr; and Zettel, Rolf, 4,696,018, Cl. 375-82.000.

Zettier, Karl-Heinz, to Westfalia Separator AG. Drum for clarifying and separating centrifugates. 4,695,270, Cl. 494-34.000.

Zhigalov, Gennady V.; Abduganiev, Abdurakhim; Kim, Sergei Y.; and Mosheev, Robert R., to Tashkentskoe Spetsialnoe Konstruktorskoe Bjuro Textilnykh Mashin. Method and apparatus for producing reinforced thread. 4,694,642, Cl. 57-5.000.

Ziegenhorn, Joachim: *See*—
Schmitt, Urban; Deeg, Rolf; and Ziegenhorn, Joachim, 4,695,552, Cl. 436-66.000.

Zijlstra, Hinne, to U.S. Philips Corporation. Nuclear magnetic resonance apparatus with a permanent magnet. 4,695,802, Cl. 324-319.000.

Zimmerman, Bernd; and Chamberlain, John, to Siecor Corporation. Fiber optic cable. 4,695,128, Cl. 350-96.230.

Zinser Textilmaschinen GmbH: *See*—
Wolf, Horst, 4,694,643, Cl. 57-100.000.

Zivitz, Maury; Ko, Eric; and Eslick, Mark, to Boehringer Mannheim GmbH. Position detector and mount therefor for a centrifugal analyzer. 4,695,164, Cl. 356-427.000.

Zucchini, Umberto: *See*—
Albizzati, Enrico; Pettenati, Enrico; Zucchini, Umberto; and Cuffiani, Illaro, 4,695,558, Cl. 502-123.000.

Zupancic, Joseph J.; and Swedo, Raymond J., to Allied Corporation. Method for the preparation of composite membranes based on interpenetrating polymer networks. 4,695,483, Cl. 427-244.000.

Zurawsky, Dieter: *See*—
Grochowski, Horst; Zurawsky, Dieter; Knoblauch, Karl; Goldschmidt, Klaus; and Schwarte, Jurgen, 4,695,444, Cl. 423-569.000.

Zwiercan, Gary A.; Lacourse, Norman L.; and Lenchin, Julianne M., to National Starch and Chemical Corporation. Imitation cheese products containing high amylose starch as total caseinate replacement. 4,695,475, Cl. 426-582.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 22ND DAY OF SEPTEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Feucht, Robert H., to Goodyear Tire & Rubber Company, The. Hose structure. Re. 32,508, Cl. 138-119.000.

Goodyear Tire & Rubber Company, The: *See*—
Feucht, Robert H., Re. 32,508, Cl. 138-119.000.

Hightower, George H., Jr., to Thomaston Mills, Inc. Snake proof chaps. Re. 32,506, Cl. 2-22.000.

Raasch, Hans: *See*—
Schmid, Friedbert; and Raasch, Hans, Re. 32,507, Cl. 57-408.000.

Schmid, Friedbert; and Raasch, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Opening roller unit for open-end spinning installations. Re. 32,507, Cl. 57-408.000.

Stahlecker, Fritz: *See*—
Schmid, Friedbert; and Raasch, Hans, Re. 32,507, Cl. 57-408.000.

Stahlecker, Hans: *See*—
Schmid, Friedbert; and Raasch, Hans, Re. 32,507, Cl. 57-408.000.

Thomaston Mills, Inc.: *See*—
Hightower, George H., Jr., Re. 32,506, Cl. 2-22.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bond, Raymond G., to Fortel Inc. Message playback control system for telephone answering machine. B1 4,558,179, 9-22-87, Cl. 379-70.000.

Delta Central Refining, Inc.: *See*—

O'Blasny, Richard H., B1 4,439,311, Cl. 208-179.000.

O'Blasny, Richard H., B1 4,504,383, Cl. 208-179.000.

Fortel Inc.: *See*—
Bond, Raymond G., B1 4,558,179, Cl. 379-70.000.

O'Blasny, Richard H., to Delta Central Refining, Inc. Rerefining used lubricating oil with hydride reducing agents. B1 4,439,311, 9-22-87, Cl. 208-179.000.

O'Blasny, Richard H., to Delta Central Refining, Inc. Rerefining used oil with borohydride reducing agents. B1 4,504,383, 9-22-87, Cl. 208-179.000.

LIST OF DESIGN PATENTEES

Abe, Takeshi: *See*—
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, 292,000, Cl. D15-199.000.

Akagawa, Masaki: *See*—
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 292,008, Cl. D20-9.000.

Aksamit, Frank J. Pet litter retriever. 292,035, 9-22-87, Cl. D30-99.000.

Albright, Lawrence S., to Jones, Jerry Burnett; and Jones, Virginia Leola. Dispensing container. 291,964, 9-22-87, Cl. D9-302.000.

Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, to Kenner Parker Toy Inc. Toy vehicle. 292,010, 9-22-87, Cl. D21-78.000.

Allied Mills Industries Pty. Limited: *See*—
Jureidini, Geoffrey N., 291,940, Cl. D1-120.000.

Alward, Jeffrey A.; and Gresens, Stanley T., to Minnesota Mining and Manufacturing Company. Antenna housing for an electronic article surveillance system. 291,976, 9-22-87, Cl. D10-121.000.

Ambasz, Emilio. Flexible pen. 292,007, 9-22-87, Cl. D19-48.000.

American Hospital Supply Corp.: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,022, Cl. D24-17.000.

Andersson, Sten-Ake. Impact wrench. 291,961, 9-22-87, Cl. D8-24.000.

AVIA Group International, Inc.: *See*—
Kelley, Brenda; and Curley, Jack, 291,945, Cl. D2-320.000.
Tong, James K., 291,943, Cl. D2-320.000.
Tong, James K., 291,944, Cl. D2-320.000.

Bernhardt Industries: *See*—
Keller, H. Thomas, 291,950, Cl. D6-430.000.
Keller, H. Thomas, 291,953, Cl. D6-488.000.

Best, Philip C., to Procter & Gamble Company, The. Bottle. 291,965, 9-22-87, Cl. D9-376.000.

Bloom, William G.: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,022, Cl. D24-17.000.

Bollinger, Howard N.: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,010, Cl. D21-78.000.

Boyd, Evangeline J.: *See*—
Roach, Donald R.; and Boyd, Evangeline J., 291,989, Cl. D14-53.000.

Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, to American Hospital Supply Corp. Handle for a diagnostic urinemeter unit. 292,022, 9-22-87, Cl. D24-17.000.

Chaplin, John B., to Textron Inc. Surface effect ship. 291,980, 9-22-87, Cl. D12-5.000.

Chia, Bret. Clown doll. 292,013, 9-22-87, Cl. D21-173.000.

Ching-Hua, Yau. Alarm. 291,975, 9-22-87, Cl. D10-106.000.

Clark, James L.: *See*—
Johnson, William G.; and Clark, James L., 291,962, Cl. D8-95.000.

Conn, Marks M., to Mallin Company. Frame for an adjustable chaise. 291,948, 9-22-87, Cl. D6-361.000.

Cornwell, Paul D., to Import Auto Products, Ltd. Dashboard panel. 291,983, 9-22-87, Cl. D12-192.000.

Cornwell, Paul D., to Import Auto Products, Ltd. Dashboard panel. 291,984, 9-22-87, Cl. D12-192.000.

Cornwell, Paul D., to Import Auto Products, Ltd. Dashboard panel. 291,985, 9-22-87, Cl. D12-192.000.

Cosden Technology, Inc.: *See*—
MacLaughlin, Donald N., 291,966, Cl. D9-389.000.
MacLaughlin, Donald N.; and Sumeren, Mark W., 291,967, Cl. D9-390.000.
MacLaughlin, Donald N., 291,968, Cl. D9-398.000.

Curley, Jack: *See*—
Kelley, Brenda; and Curley, Jack, 291,945, Cl. D2-320.000.

Dansk Pressalit A/S: *See*—
Lepoix, Louis L., 292,018, Cl. D23-71.000.

Doi, Takayoshi, to Takara Co., Ltd. Toy robot-aircraft watch. 291,973, 9-22-87, Cl. D10-33.000.

Dottori, Arduino; and Ingegnere, Roberto, to FACOM "Societe Anonyme". Tool case. 291,946, 9-22-87, Cl. D3-73.000.

Downing, Gene L.; and Fields, Ronald A. Lid for a container. 291,970, 9-22-87, Cl. D9-436.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,992, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,993, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,994, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,995, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,996, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,997, 9-22-87, Cl. D14-114.000.

Duffin, Thorvald E., II, to TDA, Inc. Personal computer keyboard template for displaying operating instructions for software program. 291,998, 9-22-87, Cl. D14-114.000.

Durand, Jean-Jacques. Silk screen stencil decoration for a plate or similar article. 291,955, 9-22-87, Cl. D7-39.000.

Eads, Harold O.; and Planthaber, Rudolph F., to O. Ames Co. Grain scoop. 291,959, 9-22-87, Cl. D8-10.000.

FACOM "Societe Anonyme": *See—*
Dottori, Arduino; and Ingegnere, Roberto, 291,946, Cl. D3-73.000.

Farmer, William. Clamp. 291,963, 9-22-87, Cl. D8-394.000.

Fenne, Kenneth R., to Pittway Corporation. Automatic thermostat control. 291,974, 9-22-87, Cl. D10-50.000.

Fenner, Paul A. Swizzle stick. 291,956, 9-22-87, Cl. D7-42.000.

Fields, Ronald A.: *See—*
Downing, Gene L.; and Fields, Ronald A., 291,970, Cl. D9-436.000.

Fujita, Mituo, to Kabushiki Kaisha Shinsei Industries. Labeler. 292,006, 9-22-87, Cl. D18-19.000.

Fukuda, Harumi, to Sharp Corporation. Electronic copying machine. 292,004, 9-22-87, Cl. D16-31.000.

Grainware Company: *See—*
Stevens, Kenneth V., 291,957, Cl. D7-70.000.

Graves, Lee K.: *See—*
Parr, Alan; and Graves, Lee K., 291,978, Cl. D12-181.000.

Green, Vernon D. Flashing light safety belt. 291,942, 9-22-87, Cl. D2-628.000.

Gresens, Stanley T.: *See—*
Alward, Jeffrey A.; and Gresens, Stanley T., 291,976, Cl. D10-121.000.

Hall, Brenda A. Toilet seat cover. 292,019, 9-22-87, Cl. D23-11.000.

Hanifl, Paul H., to Sage Products, Inc. Waste receptacle. 292,037, 9-22-87, Cl. D34-7.000.

Hanssen, Carl-Otto; and Starzmann, Bo M., to Molnlycke Aktiebolag. Surgical sheet. 292,023, 9-22-87, Cl. D24-49.000.

Hanssen, Carl-Otto; and Starzmann, Bo M., to Molnlycke Aktiebolag. Surgical sheet. 292,024, 9-22-87, Cl. D24-49.000.

Harrod, Lawrence R., to Kransco Manufacturing, Inc. Riding toy. 292,009, 9-22-87, Cl. D21-76.000.

Hendrick, William B., to Mueller Furniture Corporation. Chair. 291,949, 9-22-87, Cl. D6-375.000.

Hestair Kiddicraft Ltd.: *See—*
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,011, Cl. D21-148.000.
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,012, Cl. D21-159.000.

Higashi, Housei: *See—*
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,001, Cl. D15-199.000.
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,003, Cl. D15-199.000.
Shibayama, Masato; Imaizumi, Yutaka; and Higashi, Housei, 292,002, Cl. D15-199.000.

Hitachi, Ltd.: *See—*
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,001, Cl. D15-199.000.
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,003, Cl. D15-199.000.
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, 292,000, Cl. D15-199.000.
Shibayama, Masato; Imaizumi, Yutaka; and Higashi, Housei, 292,002, Cl. D15-199.000.

Hogan, Michael P.: *See—*
Jordan, Robert A.; Hogan, Michael P.; and Mackay, Henry J., 291,987, Cl. D13-41.000.

Holley, Robert E.: *See—*
Rumens, Kurt W. F.; and Holley, Robert E., 292,020, Cl. D23-128.000.

Hsieh, Ming-Chih. Folding golf cart. 292,038, 9-22-87, Cl. D34-15.000.

Illinois Bell Telephone Company: *See—*
Jordan, Robert A.; Hogan, Michael P.; and Mackay, Henry J., 291,987, Cl. D13-41.000.

Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, to Hitachi, Ltd. Industrial robot. 292,001, 9-22-87, Cl. D15-199.000.

Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, to Hitachi, Ltd. Industrial robot. 292,003, 9-22-87, Cl. D15-199.000.

Imaizumi, Yutaka: *See—*
Shibayama, Masato; Imaizumi, Yutaka; and Higashi, Housei, 292,002, Cl. D15-199.000.

Import Auto Products, Ltd.: *See—*
Cornwell, Paul D., 291,983, Cl. D12-192.000.
Cornwell, Paul D., 291,984, Cl. D12-192.000.
Cornwell, Paul D., 291,985, Cl. D12-192.000.

Ingegnere, Roberto: *See—*
Dottori, Arduino; and Ingegnere, Roberto, 291,946, Cl. D3-73.000.

Ishizaki, Hideaki, to Pioneer Electronic Corporation. Speaker. 291,988, 9-22-87, Cl. D14-30.000.

Johnson Level & Tool Mfg. Co.: *See—*
Johnson, William G.; and Clark, James L., 291,962, Cl. D8-95.000.

Johnson, William G.; and Clark, James L., to Johnson Level & Tool Mfg. Co. Hacksaw for hand use. 291,962, 9-22-87, Cl. D8-95.000.

Jones, Jerry Burnett: *See—*
Albright, Lawrence S., 291,964, Cl. D9-302.000.

Jones, Virginia Leola: *See—*
Albright, Lawrence S., 291,964, Cl. D9-302.000.

Jordan, Robert A.; Hogan, Michael P.; and Mackay, Henry J., to Illinois Bell Telephone Company. Mobile lightguide cable access unit for testing, rearranging and powering optical fibers. 291,987, 9-22-87, Cl. D13-41.000.

Jureidini, Geoffrey N., to Allied Mills Industries Pty. Limited. Food product. 291,940, 9-22-87, Cl. D1-120.000.

Kabushiki Kaisha Nippon Coinco: *See—*
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 292,008, Cl. D20-9.000.

Kabushiki Kaisha Shinsei Industries: *See—*
Fujita, Mituo, 292,006, Cl. D18-19.000.

Keller, H. Thomas, to Bernhardt Industries. Table. 291,950, 9-22-87, Cl. D6-430.000.

Keller, H. Thomas, to Bernhardt Industries. Table. 291,953, 9-22-87, Cl. D6-488.000.

Kelley, Brenda; and Curley, Jack, to AVIA Group International, Inc. Shoe sole. 291,945, 9-22-87, Cl. D2-320.000.

Kennedy, LeRoy F.: *See—*
Stalberger, Robert J., Jr.; and Kennedy, LeRoy F., 292,014, Cl. D21-205.000.

Kenner Parker Toy Inc.: *See—*
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,010, Cl. D21-78.000.

Kerti, Peter. Can opener. 291,960, 9-22-87, Cl. D8-18.000.

Kirkpatrick, Herman G. Tweezer. 292,031, 9-22-87, Cl. D28-55.000.

Klemm, Richard O. Seed germinator or similar article. 291,979, 9-22-87, Cl. D11-145.000.

Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, to Kabushiki Kaisha Nippon Coinco. Coin selector for automatic vendor. 292,008, 9-22-87, Cl. D20-9.000.

Kramer, Gregory D.; and Vanlanen, Daniel L., to Minnesota Mining and Manufacturing Company. Plastic supply bottle. 291,969, 9-22-87, Cl. D9-413.000.

Kransco Manufacturing, Inc.: *See—*
Harrod, Lawrence R., 292,009, Cl. D21-76.000.
Stalberger, Robert J., Jr.; and Kennedy, LeRoy F., 292,014, Cl. D21-205.000.

Krol, Leonardus A. C., to U.S. Philips Corporation. Lighting fixture. 292,026, 9-22-87, Cl. D26-77.000.

LaRoye, Eric. Lamp. 292,027, 9-22-87, Cl. D26-104.000.

Lee, Peter. Handset telephone and stand set. 291,990, 9-22-87, Cl. D14-53.000.

Lee, Peter. Handset telephone. 291,991, 9-22-87, Cl. D14-64.000.

Lepoix, Louis L., to Dansk Pressalit A/S. Combined toilet seat and cover, or similar article. 292,018, 9-22-87, Cl. D23-71.000.

Litowitz, Robert H. Window shade pull. 291,954, 9-22-87, Cl. D6-581.000.

Lobodzinski, Richard: *See—*
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,022, Cl. D24-17.000.

Lorio, Edward F. Table. 291,951, 9-22-87, Cl. D6-482.000.

Lorio, Edward F. Table. 291,952, 9-22-87, Cl. D6-482.000.

Lundstrom, Lars-Birger, to Megaron, H. B. Structural beam. 292,025, 9-22-87, Cl. D25-77.000.

Mackay, Henry J.: *See—*
Jordan, Robert A.; Hogan, Michael P.; and Mackay, Henry J., 291,987, Cl. D13-41.000.

MacLaughlin, Donald N., to Cosden Technology, Inc. Packaging container. 291,966, 9-22-87, Cl. D9-389.000.

MacLaughlin, Donald N.; and Sumeren, Mark W., to Cosden Technology, Inc. Packaging container. 291,967, 9-22-87, Cl. D9-390.000.

MacLaughlin, Donald N., to Cosden Technology, Inc. Packaging container. 291,968, 9-22-87, Cl. D9-398.000.

Mallin Company: *See—*
Conn, Marks M., 291,948, Cl. D6-361.000.

Manning, Donald L. Bus body. 291,981, 9-22-87, Cl. D12-84.000.

Margolis, Jerry, to Metaframe Inc. Rodent habitat. 292,032, 9-22-87, Cl. D30-1.000.

Margolis, Jerry, to Metaframe Inc. Rodent habitat. 292,033, 9-22-87, Cl. D30-1.000.

Maruzen Sewing Machine Co., Ltd.: *See—*
Yoneda, Yoshihide, 291,999, Cl. D15-69.000.

McQuarrie, Harvey K., to National Business Systems. Electrically powered imprinter. 292,005, 9-22-87, Cl. D18-14.000.

McWaters, James G. Hydrotherapy vest. 292,015, 9-22-87, Cl. D21-238.000.

Megaron, H. B.: *See—*
Lundstrom, Lars-Birger, 292,025, Cl. D25-77.000.

Meryman, Roy L.: *See—*
Simons, Wayne K.; Meryman, Roy L.; and Orr, Larry W., 291,982, Cl. D12-96.000.

Metaframe Inc.: *See—*
Margolis, Jerry, 292,032, Cl. D30-1.000.
Margolis, Jerry, 292,033, Cl. D30-1.000.

Minnesota Mining and Manufacturing Company: *See*—
Alward, Jeffrey A.; and Gresens, Stanley T., 291,976, Cl. D10-121.000.
Kramer, Gregory D.; and Vanlanen, Daniel L., 291,969, Cl. D9-413.000.
Molnlycke Aktiebolag: *See*—
Hanssen, Carl-Otto; and Starzmann, Bo M., 292,023, Cl. D24-49.000.
Hanssen, Carl-Otto; and Starzmann, Bo M., 292,024, Cl. D24-49.000.
Moore, Harold J. Folding golf cart. 292,039, 9-22-87, Cl. D34-15.000.
Mueller Furniture Corporation: *See*—
Hendrick, William B., 291,949, Cl. D6-375.000.
Myers, David A.: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,010, Cl. D21-78.000.
Nakata, Toshiaki, to Plus Corporation. Case for writing instruments. 291,947, 9-22-87, Cl. D3-74.000.
National Business Systems: *See*—
McQuarrie, Harvey K., 292,005, Cl. D18-14.000.
Nilsson, Aina K., to Saab-Scania Aktiebolag. Front floor mat for an automobile. 291,986, 9-22-87, Cl. D12-203.000.
O. Ames Co.: *See*—
Eads, Harold O.; and Planthaber, Rudolph F., 291,959, Cl. D8-10.000.
Ohshiro, Masayuki: *See*—
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, 292,000, Cl. D15-199.000.
Orr, Larry W.: *See*—
Simons, Wayne K.; Meryman, Roy L.; and Orr, Larry W., 291,982, Cl. D12-96.000.
Osterman, Lewis D. Horse-shaped swing. 292,016, 9-22-87, Cl. D21-246.000.
Paccar Inc: *See*—
Simons, Wayne K.; Meryman, Roy L.; and Orr, Larry W., 291,982, Cl. D12-96.000.
Pape, John A.: *See*—
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,011, Cl. D21-148.000.
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,012, Cl. D21-159.000.
Parr, Alan; and Graves, Lee K., to Wickes Manufacturing Company. Spoiler vane for small vans. 291,978, 9-22-87, Cl. D12-181.000.
Pensa, Inc.: *See*—
Peterson, Robert L., 291,941, Cl. D2-320.000.
Perkinson, William H. Aquarium. 292,034, 9-22-87, Cl. D30-8.000.
Peterson, Robert L., to Pensa, Inc. Shoe sole. 291,941, 9-22-87, Cl. D2-320.000.
Pfeiffer Kunststofftechnik GmbH: *See*—
Pfeiffer, Peter, 291,972, Cl. D9-448.000.
Pfeiffer, Peter, to Pfeiffer Kunststofftechnik GmbH. Dispensing pump closure. 291,972, 9-22-87, Cl. D9-448.000.
Pioneer Electronic Corporation: *See*—
Ishizaki, Hideaki, 291,988, Cl. D14-30.000.
Pittway Corporation: *See*—
Fenne, Kenneth R., 291,974, Cl. D10-50.000.
Planthaber, Rudolph F.: *See*—
Eads, Harold O.; and Planthaber, Rudolph F., 291,959, Cl. D8-10.000.
Plus Corporation: *See*—
Nakata, Toshiaki, 291,947, Cl. D3-74.000.
Procter & Gamble Company, The: *See*—
Best, Philip C., 291,965, Cl. D9-376.000.
Raffo, David M.: *See*—
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,011, Cl. D21-148.000.
Thomson, Harry S.; Raffo, David M.; and Pape, John A., 292,012, Cl. D21-159.000.
Religious Telephone Company Ltd.: *See*—
Roach, Donald R.; and Boyd, Evangeline J., 291,989, Cl. D14-53.000.
Revson, Rommy. Ornamental hairband or similar article. 292,030, 9-22-87, Cl. D28-41.000.
Rhodes, Andrew. Pocket ashtray. 292,028, 9-22-87, Cl. D27-8.000.
Roach, Donald R.; and Boyd, Evangeline J., to Religious Telephone Company Ltd. Telephone. 291,989, 9-22-87, Cl. D14-53.000.
Rumens, Kurt W. F.; and Holley, Robert E. Stove door. 292,020, 9-22-87, Cl. D23-128.000.
Saab-Scania Aktiebolag: *See*—
Nilsson, Aina K., 291,986, Cl. D12-203.000.
Sage Products, Inc.: *See*—
Hanifl, Paul H., 292,037, Cl. D34-7.000.
Sealright Co., Inc.: *See*—
Smith, Ernest L., 291,971, Cl. D9-447.000.
Sebring, Linda B. Jewelry finding. 291,977, 9-22-87, Cl. D11-54.000.
Sharp Corporation: *See*—
Fukuda, Harumi, 292,004, Cl. D16-31.000.
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, to Hitachi, Ltd. Industrial robot. 292,000, 9-22-87, Cl. D15-199.000.
Shibayama, Masato; Imaizumi, Yutaka; and Higashi, Housei, to Hitachi, Ltd. Industrial robot. 292,002, 9-22-87, Cl. D15-199.000.
Shibayama, Masato: *See*—
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,001, Cl. D15-199.000.
Imaizumi, Yutaka; Higashi, Housei; and Shibayama, Masato, 292,003, Cl. D15-199.000.
Siegel, Bernard: *See*—
Bullock, James K.; Bloom, William G.; Siegel, Bernard; and Lobodzinski, Richard, 292,022, Cl. D24-17.000.
Simons, Wayne K.; Meryman, Roy L.; and Orr, Larry W., to Paccar Inc. Truck cab. 291,982, 9-22-87, Cl. D12-96.000.
Simpson, Eric J.: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,010, Cl. D21-78.000.
Smith, Ernest L., to Sealright Co., Inc. Container lid. 291,971, 9-22-87, Cl. D9-447.000.
Stalberger, Robert J., Jr.; and Kennedy, LeRoy F., to Kransco Manufacturing, Inc. Footbag. 292,014, 9-22-87, Cl. D21-205.000.
Starzmann, Bo M.: *See*—
Hanssen, Carl-Otto; and Starzmann, Bo M., 292,023, Cl. D24-49.000.
Hanssen, Carl-Otto; and Starzmann, Bo M., 292,024, Cl. D24-49.000.
Stevens, Kenneth V., to Grainware Company. Combined canape tray and glass holder. 291,957, 9-22-87, Cl. D7-70.000.
Stoll, Walter. Combined endodontic gauge and instrument holder. 292,021, 9-22-87, Cl. D24-16.000.
Sumeren, Mark W.: *See*—
MacLaughlin, Donald N.; and Sumeren, Mark W., 291,967, Cl. D9-390.000.
Sussman, Howard. Trash bag holder. 292,036, 9-22-87, Cl. D34-6.000.
Takara Co., Ltd.: *See*—
Doi, Takayoshi, 291,973, Cl. D10-33.000.
Tanaka, Masanori: *See*—
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 292,008, Cl. D20-9.000.
TDA, Inc.: *See*—
Duffin, Thorvald E., II, 291,992, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,993, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,994, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,995, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,996, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,997, Cl. D14-114.000.
Duffin, Thorvald E., II, 291,998, Cl. D14-114.000.
Textron Inc.: *See*—
Chaplin, John B., 291,980, Cl. D12-5.000.
Thomson, Harry S.; Raffo, David M.; and Pape, John A., to Hestair Kiddicraft Ltd. Child's figure toy. 292,011, 9-22-87, Cl. D21-148.000.
Thomson, Harry S.; Raffo, David M.; and Pape, John A., to Hestair Kiddicraft Ltd. Toy figure. 292,012, 9-22-87, Cl. D21-159.000.
Tong, James K., to AVIA Group International, Inc. Shoe sole. 291,943, 9-22-87, Cl. D2-320.000.
Tong, James K., to AVIA Group International, Inc. Shoe sole. 291,944, 9-22-87, Cl. D2-320.000.
Tsuchida, Nobuo, to Uchida Manufacturing Co., Ltd. Demineralizing filter for ultrasonic humidifiers. 292,017, 9-22-87, Cl. D23-4.000.
Tsuji, Ko: *See*—
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, 292,000, Cl. D15-199.000.
Tullberg, William M. Roasting rack. 291,958, 9-22-87, Cl. D7-409.000.
Uchida, Akira: *See*—
Shibayama, Masato; Abe, Takeshi; Tsuji, Ko; Uchida, Akira; and Ohshiro, Masayuki, 292,000, Cl. D15-199.000.
Uchida Manufacturing Co., Ltd.: *See*—
Tsuchida, Nobuo, 292,017, Cl. D23-4.000.
U.S. Philips Corporation: *See*—
Krol, Leonardus A. C., 292,026, Cl. D26-77.000.
Vanlanen, Daniel L.: *See*—
Kramer, Gregory D.; and Vanlanen, Daniel L., 291,969, Cl. D9-413.000.
Wickes Manufacturing Company: *See*—
Parr, Alan; and Graves, Lee K., 291,978, Cl. D12-181.000.
Williams, W. Grey: *See*—
Allen, Robert K.; Bollinger, Howard N.; Myers, David A.; Simpson, Eric J.; and Williams, W. Grey, 292,010, Cl. D21-78.000.
Yamagishi, Ryoji: *See*—
Kobayashi, Osamu; Tanaka, Masanori; Akagawa, Masaki; and Yamagishi, Ryoji, 292,008, Cl. D20-9.000.
Yoneda, Yoshihide, to Maruzen Sewing Machine Co., Ltd. Sewing machine. 291,999, 9-22-87, Cl. D15-69.000.
Yoshinaga Prince Company Limited: *See*—
Yoshinaga, Sadao, 292,029, Cl. D27-36.000.
Yoshinaga, Sadao, to Yoshinaga Prince Company Limited. Lighter. 292,029, 9-22-87, Cl. D27-36.000.

LIST OF PLANT PATENTEES

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Gypsy. 6,017, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Rosy. 6,018, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Josy. 6,019, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Peggy. 6,020, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Sally. 6,021, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Lilly. 6,022, 9-22-87, Cl. 68.000.

Kirmann, Wolfgang, to Vavra, Mirko. Geranium plant named Candy. 6,023, 9-22-87, Cl. 68.000.

Vavra, Mirko: *See*—
Kirmann, Wolfgang, 6,017, Cl. 68.000.
Kirmann, Wolfgang, 6,018, Cl. 68.000.
Kirmann, Wolfgang, 6,019, Cl. 68.000.
Kirmann, Wolfgang, 6,020, Cl. 68.000.
Kirmann, Wolfgang, 6,021, Cl. 68.000.
Kirmann, Wolfgang, 6,022, Cl. 68.000.
Kirmann, Wolfgang, 6,023, Cl. 68.000.

CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 22, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

2 4,694,505
8 4,694,507
12 4,694,506
21 4,694,508
22 Re.32,506
49 R 4,694,510
69 4,694,511
144 4,694,509

CLASS 4

192 4,694,512
288 4,694,513

CLASS 5

12 R 4,694,514
13 4,694,515
93 R 4,694,516
114 4,694,517
136 4,694,518
200 C 4,694,519
453 4,694,520
4,694,521

CLASS 8

137 4,695,284
429 4,695,285
471 4,695,286
4,695,287
4,695,288
573 4,695,289

CLASS 14

71.1 4,694,522

CLASS 15

53 B 4,694,523
130 4,694,524
160 4,694,525
306 A 4,694,526
308 4,694,527
330 4,694,528
393 4,694,529

CLASS 16

82 4,694,530
87.4 R 4,694,531
94 D 4,694,532
257 4,694,533

CLASS 17

1 E 4,694,534
4,694,535
37 4,694,536
49 4,694,537

CLASS 19

105 4,694,538
159 A 4,694,539
159 R 4,694,540

CLASS 24

30.5 S 4,694,542
301 4,694,541
461 4,694,543
625 4,694,544

CLASS 29

1 R 4,694,545
81 D 4,694,546
157 C 4,694,548
157 R 4,694,547
157.3 C 4,694,549
267 4,694,550
402.08 4,694,551
418 4,694,552
445 4,694,553
450 4,694,554
451 4,694,555
4,694,556
525 4,694,557
527.2 4,694,558
559 4,694,559
564.1 4,694,560
599 4,694,567
620 4,694,568
724 4,694,569
740 4,694,570
806 4,694,571
840 4,694,572
846 4,694,573

CLASS 30

94 4,694,574
221 4,694,575
280 4,694,576
379.5 4,694,577
383 4,694,578

CLASS 33

23.08 4,694,579
32.6 4,694,580
169 R 4,694,581
361 4,694,583
366 4,694,584
502 4,694,585
635 4,694,582

CLASS 34

1 4,694,586
23 4,694,587
77 4,694,588

CLASS 36

44 4,694,589
91 4,694,590
102 4,694,591
117 4,694,592
120 4,694,593

CLASS 37

244 4,694,594

CLASS 40

19.5 4,694,595
20 R 4,694,596
117 4,694,597
155 4,694,598
449 4,694,599
518 4,694,600
610 4,694,601

CLASS 42

59 4,694,602

CLASS 43

21.2 4,694,603
114 4,694,604
137 4,694,605

CLASS 44

1 S R 4,695,290
62 4,695,291
64 4,695,292
68 4,695,293

CLASS 47

56 4,694,606

CLASS 49

25 4,694,607
50 4,694,608
193 4,694,609
351 4,694,610
441 4,694,611
445 4,694,612

CLASS 51

34 C 4,694,613
141 4,694,614
168 4,694,615
170 EB 4,694,616
287 4,694,617
307 4,695,294
392 4,694,618

CLASS 52

20 4,694,619
65 4,694,620
79.13 4,694,621
223 L 4,694,623
223 R 4,694,622
228 4,694,624
294 4,694,625
309.12 4,694,626
390 4,694,627
528 4,694,628
611 4,694,629
649 4,694,630

CLASS 53

49 4,694,633
55 4,694,631
4,694,632
88 4,694,634
137 4,694,635
399 4,694,636
448 4,694,637
459 4,694,638

CLASS 55

16 4,695,295
68 4,695,296
112 4,695,297
223 4,695,298
274 4,695,299
485 4,695,300
523 4,695,301

CLASS 56

10.2 4,694,639
16.4 4,694,640
328 R 4,694,641

CLASS 57

5 4,694,642
100 4,694,643
408 Re.32,507

CLASS 59

27 4,694,644

CLASS 60

221 4,694,645
272 4,694,646
442 4,694,647
452 4,694,648
468 4,694,649
520 4,694,650
578 4,694,651
585 4,694,652
597 4,694,653
605 4,694,654

CLASS 62

10 4,695,302
24 4,695,303
27 4,695,304
51 4,694,655
72 4,694,656
80 4,694,657
100 4,694,658
106 4,694,659
196.4 4,694,660
344 4,694,661
509 4,694,662
514 R 4,694,663

CLASS 63

12 4,694,664

CLASS 65

18.3 4,695,305
152 4,695,306
242 4,695,307

CLASS 68

27 4,694,665

CLASS 70

16 4,694,666
49 4,694,667
63 4,694,668
100 4,694,669
303 R 4,694,670

CLASS 71

86 4,695,308
88 4,695,309
90 4,695,310
92 4,695,311
4,695,312
100 4,695,313
4,695,314

CLASS 72

26 4,694,671
53 4,694,672
272 4,694,673
305 4,694,674
325 4,694,675
348 4,694,676
393 4,694,677
455 4,694,678

CLASS 73

1 DV 4,694,680
1 R 4,694,679
3 4,694,681
40.5 R 4,694,695
61.1 C 4,694,682
63 4,694,683
65 4,694,684
104 4,694,685
4,694,686
116 4,694,687
4,694,688
118.1 4,694,689
146 4,694,690
146.8 4,694,691
155 4,694,692
168 4,694,693
386 4,694,694
497 4,694,696
570 4,694,698
606 4,694,699
861.24 4,694,702

CLASS 74

5 F 4,694,703
191 4,694,701
200 4,694,704
501 R 4,694,705
501.5 R 4,694,706
606 A 4,694,707
750 B 4,694,708
866 4,694,709

CLASS 75

0.5 R 4,695,315
10.14 4,695,316
24 4,695,317
51.1 4,695,318
63 4,695,319
67 A 4,695,320
243 4,695,321
628 4,694,700

CLASS 76

108 R 4,694,710

CLASS 81

57.17 4,694,712
57.5 4,694,711

CLASS 82

14 R 4,694,713

CLASS 83

13 4,694,714
72 4,694,715
112 4,694,716
222 4,694,717
319 4,694,718
451 4,694,719
471.3 4,694,720
4,694,721
885 4,694,722

CLASS 84

1.03 4,694,723
4,694,724
1.27 4,694,725
413 4,694,726

CLASS 86

20.15 4,694,727

CLASS 89

1.11 4,694,728
8 4,694,729

CLASS 91

170 MP 4,694,730
421 4,694,731

CLASS 92

60.5 4,694,732
88 4,694,733
130 R 4,694,734
208 4,694,735

CLASS 98

31.6 4,694,736

CLASS 99

279 4,694,737
4,694,738
289 R 4,694,739
323.3 4,694,740
354 4,694,741
404 4,694,742
405 4,694,743

CLASS 100

214 4,694,744

CLASS 101

111 4,694,745
124 4,694,746
301 4,694,747
401.1 4,694,748
426 4,694,749
4,694,750

CLASS 102

202 4,694,751
215 4,694,752
289 4,694,753
310 4,694,754
445 4,694,755

CLASS 106

35 4,695,322
85 4,695,323
96 4,695,324
100 4,695,325

CLASS 110

238 4,694,756
271 4,694,757
347 4,694,758

CLASS 111

85 4,694,759
92 4,694,760

CLASS 112

80.71 4,694,761
121.12 4,694,762
184 4,694,763
237 4,694,764
254 4,694,765
262.1 4,694,766
303 4,694,767

CLASS 114

71 4,694,768
90 4,694,769
123 4,694,770
230 4,694,771
315 4,694,772
354 4,694,773
361 4,694,774

CLASS 118

64 4,694,775
500 4,694,776
725 4,694,777
728 4,694,778
730 4,694,779

CLASS 119

53.5 4,694,780
156 4,694,781

CLASS 122

7 R 4,694,782
448 B 4,694,783

CLASS 123

41.12 4,694,784
52 A 4,694,785
73 AD 4,694,786
90.13 4,694,787
90.16 4,694,788
90.17 4,694,789
90.58 4,694,790
179 F 4,694,791
187.5 R 4,694,792
196 S 4,694,793
306 4,694,794
325 4,694,796
339 4,694,797
4,694,798
373 4,694,795
425 4,694,799
4,694,800
4,694,801
431 4,694,802
440 4,694,803
453 4,694,804
462 4,694,804
489 4,694,805
4,694,809
494 4,694,806
501 4,694,807
516 4,694,810
527 4,694,811
571 4,694,812
644 4,694,814
668 4,694,813

CLASS 124

27 4,694,815

CLASS 126

41 R 4,694,816
76 4,694,817
121 4,694,818
140 4,694,819
289 4,694,820

CLASS 127

30 4,695,326

CLASS 128

4 4,694,821
11 4,694,822
76 B 4,694,823
203.22 4,694,824
205.24 4,694,825
303 R 4,694,826
4,694,827
303.1 4,694,828
399 4,694,829
419 PG 4,694,830
582 4,694,831
632 4,694,832
633 4,694,833
635 4,694,834
640 4,694,835
653 4,694,836
4,694,837
658 4,694,838
721 4,694,839
735 4,694,840

CLASS 131

351 4,694,841
359 4,694,842

CLASS 132

73 4,694,843
84 R 4,694,844

CLASS 134

11 4,695,327
78 4,694,846

CLASS 136

256 4,695,674

CLASS 137

39 4,694,847
114 4,694,848
312 4,694,849
318 4,694,850
499 4,694,851
501 4,694,852
512.1 4,694,853
519 4,694,854
519.5 4,694,855
555 4,694,856
565 4,694,857
596 4,694,858
614.04 4,694,859
614.21 4,694,860
624.19 4,694,861
625.5 4,694,862

CLASS 138

96 R 4,694,863
113 4,694,864
119 Re.32,508
148 4,694,865

CLASS 139

13 R 4,694,866
192 4,694,867

CLASS 140

92.1 4,694,868
119 4,694,869

CLASS 141

326 4,694,870

CLASS 144

35 R 4,694,871

CLASS 148

3 4,695,329
6.3 4,695,330
306 4,695,333

CLASS 152

216 4,694,872
380 4,694,873
381.5 4,694,874

CLASS 156

62.2 4,695,334
64 4,695,335
67 4,695,336
69 4,695,337
71 4,695,338
80 4,695,339
161 4,695,340
4,695,341
173 4,695,342
196 4,695,343
242 4,695,344
264 4,695,345
361 4,695,346
610 4,695,347
647 4,695,348

CLASS 157

1.24 4,694,875

CLASS 160

45 4,694,876
273 R 4,694,877

CLASS 164

7.2 4,694,879
113 4,694,881
4,694,882
186 4,694,883
359 4,694,884
416 4,694,885
4,694,886
428 4,694,887
452 4,694,899
459 4,694,880
467 4,694,888
488 4,694,889

CLASS 165

12 4,694,890
41 4,694,891
95 4,694,892
104.34 4,694,893
135 4,694,894
136 4,694,895
142 4,694,896
160 4,694,897
171 4,694,898

CLASS 166

75.1 4,694,900
77 4,694,901
250 4,694,902
4,694,903
252 4,694,904
280 4,694,905
294 4,694,906
303 4,694,907
310 4,694,908
359 4,694,909
377 4,694,878
379 4,694,910

CLASS 173

62 4,694,911
115 4,694,912

CLASS 174

15 CA 4,695,675
22 R 4,695,676
52 FP 4,695,678
117 FF 4,695,679

CLASS 175

61 4,694,913
4,694,914
91 4,694,915
249 4,694,916
299 4,694,917
329 4,694,918
393 4,694,919

CLASS 177

25 4,694,920
136 4,694,921
178 4,694,922

CLASS 178

19 4,695,680

CLASS 180

6.5 4,694,923
68.3 4,694,924
79.1 4,694,925
132 4,694,926
4,694,927
268 4,694,928
311 4,694,929

CLASS 182

2 4,694,930
3 4,694,931
109 4,694,932
128 4,694,933
142 4,694,934

CLASS 187

111 4,694,935

CLASS 188

2 R 4,694,936
73.1 4,694,937
181 A 4,694,938
287 4,694,939

CLASS 190

109 4,694,940

CLASS 192

3.28 4,694,941
13 A 4,694,942
35 4,694,943
56 R 4,694,944
84 C 4,694,945
85 AA 4,694,946

CLASS 193

34 4,694,947

CLASS 194

45 TD 4,695,677

CLASS 198

311 4,694,948
351 4,694,949
465.3 4,694,950
468.3 4,694,951
499 4,694,952
627 4,694,953

CLASS 200

5 A 4,695,681
5 R 4,695,682
38 R 4,695,683
43.07 4,695,684
61.21 4,695,685
61.86 4,695,686
144 B 4,695,687
4,695,688
4,695,689
147 R 4,695,690
303 4,695,691
335 4,695,692

CLASS 203

26 4,695,349
51 4,695,350

CLASS 204

15 4,695,351
74 4,695,352
96 4,695,353
157.41 4,695,357
174 4,695,358
180.1 4,695,354
180.9 4,695,356
252 4,695,355
255 4,695,359
404 4,695,360
415 4,695,361
419 4,695,362

CLASS 206

45.26 4,694,954
45.29 4,694,955
83 4,694,956
309 4,694,957
340 4,694,958
390 4,694,959
469 4,694,960
508 4,694,961
600 4,694,962

CLASS 208

33 4,695,363
59 4,695,364
89 4,695,365
91 4,695,366
106 4,695,367
111 4,695,368
112 4,695,369
113 4,695,370
179 B1 4,439,311
B1 4,504,383
311 4,695,372
428 4,695,373

CLASS 209

211 4,695,371
534 4,694,963
549 4,694,964

CLASS 210

110 4,695,375
122 4,695,376
132 4,695,377
198.1 4,695,378
282 4,695,379
347 4,695,380
403 4,695,381
436 4,695,382
500.37 4,695,383
602 4,695,384
636 4,695,385
665 4,695,386
676 4,695,387
760 4,695,388

CLASS 211

87 4,694,965
88 4,694,966
126 4,694,967

CLASS 215

224 4,694,968
252 4,694,969
4,694,970
253 4,694,971

CLASS 219

10.55 D 4,695,694
10.55 F 4,695,693
10.55 M 4,695,695
69 P 4,695,696
121 L 4,695,698
121 LD 4,695,699
121 LV 4,695,701
121 LZ 4,695,697
121 PD 4,695,700
137.63 4,695,702
212 4,695,703
222 4,695,704
354 4,695,705
390 4,695,706
392 4,695,707
486 4,695,708
494 4,695,709
506 4,695,710
4,695,711
535 4,695,712
553 4,695,713

CLASS 220

401 4,694,972

CLASS 221

46 4,694,973
263 4,694,974

CLASS 222

1 4,694,975
189 4,694,976
259 4,694,977

CLASS 223

28 4,694,978

CLASS 224

151 4,694,979
243 4,694,980
251 4,694,981

CLASS 226

115 4,694,982
181 4,694,983

CLASS 227

18 4,694,984

CLASS 228

235 4,694,985

CLASS 229

41 R 4,694,986
114 4,694,987

CLASS 236

49 4,694,988
4,694,989

CLASS 237

8 R 4,695,052

CLASS 239

81 4,694,990
171 4,694,991
265.23 4,694,992

CLASS 241

46.11 4,694,993
79.1 4,694,994
92 4,694,995
100 4,694,996
117 4,694,997

CLASS 242

1 4,694,998
4 R 4,694,999
18 DD 4,695,000
25 R 4,695,001
47.01 4,695,002
55.19 A 4,695,003
56 R 4,695,004
4,695,005
56.3 4,695,006
58.4 4,695,007
68.5 4,695,008
84.1 R 4,695,009
158 R 4,695,010
199 4,695,011

CLASS 244

17.13 4,695,013
26 4,695,012
213 4,695,014

CLASS 245

6 4,695,015

CLASS 246

415 A 4,695,016
428 4,695,017

CLASS 248

74.2 4,695,018
74.3 4,695,019
100 4,695,020
168 4,695,021
176 4,695,022
238 4,695,023
281.1 4,695,024
293 4,695,025
316.5 4,695,026
325 4,695,027
354.1 4,695,028
360 4,695,029
507 4,695,030

CLASS 249

91 4,695,031
112 4,695,032
189 4,695,033

CLASS 250

205 4,695,714
211 J 4,695,715
211 R 4,695,716
213 R 4,695,717
213 VT 4,695,718
216 4,695,719
231 SE 4,695,720
234 4,695,721
235 4,695,722
292 4,695,724
325 4,695,723
327.2 4,695,725
4,695,726
328 4,695,727
336.1 4,695,728
358.1 4,695,729
370 4,695,730
374 4,695,731
492.2 4,695,732
551 4,695,733
573 4,695,734

CLASS 251

129.06 4,695,034

CLASS 252

8.553 4,695,389
47.5 4,695,390
51.5 A 4,695,391
62.54 4,695,392
4,695,393
97 4,695,394
121 4,695,395
135 4,695,396
182 4,695,397
299.5 4,695,398
301.35 4,695,399
309 4,695,400
312 4,695,401
315.2 4,695,402
513 4,695,403
514 4,695,404
600 4,695,405

CLASS 254

93 R 4,695,035
126 4,695,036
131 4,695,037
134.3 FT 4,695,038
134.3 R 4,695,039
264 4,695,040

CLASS 260

372 4,695,406
395 4,695,408
400 4,695,409
410.5 4,695,410
410.9 R 4,695,411
507 R 4,695,412

CLASS 264

3.1 4,695,414
29.2 4,695,415
45.4 4,695,416
80 4,695,417
151 4,695,418
259 4,695,419
265 4,695,420
318 4,695,421
504 4,695,422

CLASS 266

66 4,695,041
226 4,695,042
265 4,695,043

CLASS 269

21 4,695,044
152 4,695,045
210 4,695,046
309 4,695,047

CLASS 271

122 4,695,048

CLASS 272

67 4,695,049
72 4,695,050
122 4,695,051

CLASS 273

143 R 4,695,053
171 4,695,054
213 4,695,055
262 4,695,056
269 4,695,057
311 4,695,058
360 4,695,059
404 4,695,060

CLASS 277

27 4,695,061
4,695,062
134 4,695,063
139 4,695,064

CLASS 279

60 4,695,065
62 4,695,066

CLASS 280

47.22 4,695,067
91 4,695,068
4,695,069
154.5 R 4,695,070
650 4,695,072
690 4,695,073
707 4,695,074
735 4,695,075
804 4,695,076

CLASS 283

81 4,695,077

CLASS 285

98 4,695,078
278 4,695,079
334.5 4,695,080

CLASS 290

38 R 4,695,735
44 4,695,736
204 4,695,071

CLASS 292

96 4,695,081
169.16 4,695,082
241 4,695,083

CLASS 293

126 4,695,084

CLASS 294

15 4,695,085
68.23 4,695,086

CLASS 296

14 4,695,087
38 4,695,088
107 4,695,089
216 4,695,090

CLASS 297

180 4,695,091
230 4,695,092
300 4,695,093
331 4,695,094
410 4,695,095
417 4,695,096
452 4,695,097

CLASS 299

64 4,695,098

CLASS 301

37 SA 4,695,099

CLASS 303

10 4,695,100
117 4,695,101

CLASS 305

11 4,695,102

CLASS 307

31 4,695,737
4,695,738
141 4,695,739
242 4,695,740
271 4,695,742
272.2 4,695,743
279 4,695,744
297 4,695,745
4,695,746
317 R 4,695,747
355 4,695,748
455 4,695,749
475 4,695,750
490 4,695,751
518 4,695,752
530 4,695,753
643 4,695,741

CLASS 310

156 4,695,754
236 4,695,755
355 4,695,756

CLASS 312

18 4,695,103
26 4,695,104

CLASS 313

44 4,695,757
130 4,695,758
136 4,695,759
348 4,695,760
407 4,695,761
474 4,695,762
487 4,695,763
497 4,695,764
4,695,765

CLASS 315

3.5 4,695,766
58 4,695,767
73 4,695,768
158 4,695,769
207 4,695,770
290 4,695,771
370 4,695,772
382 4,695,773
408 4,695,774
410 4,695,775

CLASS 318

14 4,695,776
135 4,695,777
314 4,695,778
484 4,695,779
561 4,695,780
603 4,695,781
748 4,695,782
808 4,695,783

CLASS 320

32 4,695,784

CLASS 323

222 4,695,785
303 4,695,786

CLASS 324

61 P 4,695,789
77 K 4,695,790
78 D 4,695,791
83 D 4,695,792
106 4,695,793
158 R 4,695,794
208 4,695,795
226 4,695,796
230 4,695,797
307 4,695,798
4,695,799
309 4,695,800
318 4,695,801
319 4,695,802
403 4,695,803
527 4,695,788
557 4,695,787

CLASS 328

14 4,695,804
72 4,695,805

CLASS 330

254 4,695,806
310 4,695,807

CLASS 331

57 4,695,808
117 D 4,695,809

CLASS 333

1 4,695,810
105 4,695,811
156 4,695,812

CLASS 335

78 4,695,813

CLASS 337

77 4,695,814
266 4,695,815
394 4,695,816

CLASS 338

4 4,695,817
22 R 4,695,818
153 4,695,819

179 4,695,820
316 4,695,821

CLASS 340

53 4,695,822
58 4,695,823
347 DA 4,695,826
347 SH 4,695,825
365 P 4,695,827
365 S 4,695,828
586 4,695,829
677 4,695,830
707 4,695,831
709 4,695,832
722 4,695,833
734 4,695,834
750 4,695,835
4,695,836
763 4,695,837
771 4,695,838
825.054 4,695,840
825.06 4,695,839

CLASS 342

8 4,695,841
59 4,695,842
417 4,695,843

CLASS 343

781 CA 4,695,844
873 4,695,845

CLASS 346

1.1 4,695,846
4,695,847
4,695,848
76 L 4,695,849
76 PH 4,695,850
140 R 4,695,824
4,695,851
4,695,852
4,695,853
4,695,854
145 4,695,855

CLASS 350

1.2 4,695,119
96.11 4,695,120
96.12 4,695,121
4,695,122
96.15 4,695,123
96.20 4,695,124
4,695,125
96.21 4,695,126
96.23 4,695,127
4,695,128
96.25 4,695,129
132 4,695,130
350 R 4,695,131
409 4,695,132
427 4,695,133
432 4,695,134
452 4,695,135
472 4,695,136
521 4,695,137
615 4,695,138
620 4,695,139

CLASS 351

139 4,695,140

CLASS 352

50 4,695,141

CLASS 354

76 4,695,142
86 4,695,143
195.11 4,695,144
271.1 4,695,145
309 4,695,146
322 4,695,147
413 4,695,148
430 4,695,149
448 4,695,150

CLASS 355

3 DD 4,695,153
3 R 4,695,151
4,695,152
8 4,695,154
45 4,695,155

CLASS 356

1 4,695,156
123 4,695,158
237 4,695,157
247 4,695,159
254 4,695,161
350 4,695,160
369 4,695,162
4,695,163
427 4,695,164

CLASS 357

4 4,695,856
16 4,695,857
19 4,695,858
4,695,859
24 LR 4,695,860
30 4,695,861
36 4,695,862
38 4,695,863
41 4,695,864
4,695,865
42 4,695,866
46 4,695,867
68 4,695,868
71 4,695,869
74 4,695,870
4,695,871
75 4,695,872

CLASS 358

13 4,695,873
21 R 4,695,874
28 4,695,875
31 4,695,876
36 4,695,877
44 4,695,878
84 4,695,879
86 4,695,880
100 4,695,881
136 4,695,882
138 4,695,883
163 4,695,884
168 4,695,885
176 4,695,886
213.13 4,695,887
4,695,888
4,695,891
213.26 4,695,889
213.31 4,695,890
225 4,695,892
227 4,695,893
228 4,695,894
280 4,695,895
296 4,695,896
4,695,897
4,695,898
310 4,695,899
4,695,900
332 4,695,902
335 4,695,903
342 4,695,904

CLASS 360

33.1 4,695,905
85 4,695,906
107 4,695,907
119 4,695,908
122 4,695,909
133 4,695,910
4,695,911
4,695,912

CLASS 361

13 4,695,913
18 4,695,413
42 4,695,914
56 4,695,915
4,695,916
58 4,695,917
4,695,918
110 4,695,919
118 4,695,920
308 4,695,921
329 4,695,922
361 4,695,923
386 4,695,924
395 4,695,925
4,695,926
400 4,695,927

CLASS 362

61 4,695,928
140 4,695,929
293 4,695,930

CLASS 363

8 4,695,931
14 4,695,932
17 4,695,933
4,695,934
21 4,695,935
4,695,936
25 4,695,937
37 4,695,938
39 4,695,939
157 4,695,940

CLASS 364

165 4,695,941
188 4,695,942
200 4,695,943
4,695,944
4,695,945
4,695,946
4,695,947
4,695,948
4,695,949
4,695,950
4,695,951
4,695,952
410 4,695,953
413 4,695,954
4,695,955
416 4,695,956
422 4,695,957
424 4,695,958
458 4,695,959
474 4,695,960
483 4,695,961
506 4,695,982
513 4,695,963
513.5 4,695,962
518 4,695,964
4,695,965
521 4,695,966
4,695,967
578 4,695,968
709 4,695,983
724 4,695,969
4,695,970
769 4,695,971
819 4,695,972
822 4,695,973
900 4,695,974
4,695,975
4,695,976
4,695,977

CLASS 365

51 4,695,978
185 4,695,979
222 4,695,980
227 4,695,981

CLASS 366

90 4,695,165
160 4,695,166
181 4,695,167

CLASS 367

54 4,695,984
87 4,695,985
140 4,695,986
143 4,695,987
154 4,695,988

CLASS 368

31 4,695,168

CLASS 369

32 4,695,989
38 4,695,990
44 4,695,991
46 4,695,992
54 4,695,993
4,695,994
75.2 4,695,995
77.1 4,695,996

CLASS 370

13 4,695,997
32.1 4,695,998
58 4,695,999
60 4,696,000
88 4,696,001

CLASS 371

12 4,696,002
19 4,696,003
25 4,696,004
27 4,696,005
4,696,006
37 4,696,007
47 4,696,008

CLASS 372

25 4,696,009
34 4,696,010
61 4,696,011
99 4,696,012

CLASS 373

71 4,696,013
89 4,696,014

CLASS 375

14 4,696,015
20 4,696,016
60 4,696,017
82 4,696,018
107 4,696,019

CLASS 376

265 4,695,423
272 4,695,424
435 4,695,425
441 4,695,426

CLASS 377

48 4,696,020
58 4,696,021

CLASS 378

41 4,696,022
46 4,696,023
73 4,696,024
146 4,696,025

CLASS 379

34 4,696,026
60 4,696,027
70 B1 4,558,179
88 4,696,028
92 4,696,029
167 4,696,030
386 4,696,031
390 4,696,032
424 4,696,033

CLASS 380

5 4,695,901
16 4,696,034

CLASS 381

1 4,696,035
22 4,696,036
24 4,696,037
38 4,696,038
46 4,696,039
4,696,040
4,696,041
51 4,696,042
92 4,696,043
106 4,696,044
114 4,696,045

CLASS 382

5 4,696,046
8 4,696,047
13 4,696,048
22 4,696,049

CLASS 383

10 4,696,050

CLASS 384

36 4,695,169
45 4,695,170

CLASS 400

70 4,695,171
83 4,695,172
120 4,695,173
124 4,695,174
196.1 4,695,175

CLASS 401

144 4,695,176
150 4,695,177

CLASS 403

14 4,695,178
24 4,695,179
114 4,695,180
135 4,695,181
140 4,695,182
356 4,695,183
410 4,695,184

CLASS 404

107 4,695,185
111 4,695,186

CLASS 405

124 4,695,187
150 4,695,188
169 4,695,189
4,695,190
195 4,695,191
203 4,695,192
204 4,695,193
207 4,695,194
220 4,695,195
224 4,695,196
4,695,197
4,695,198
4,695,199
4,695,200
4,695,201
227 4,695,202
230 4,695,203
283 4,695,204

CLASS 406

38 4,695,205
65 4,695,206
130 4,695,207

CLASS 407

106 4,695,208

CLASS 409

42 4,695,209
219 4,695,210

CLASS 410

77 4,695,211

CLASS 411

85 4,695,212
506 4,695,213

CLASS 414

221 4,695,214
225 4,695,215
401 4,695,216
404 4,695,217
462 4,695,218
787 4,695,219

CLASS 415

9 4,695,220
36 4,695,221
80 4,695,222
90 4,695,223
116 4,695,224
189 4,695,225

CLASS 416

106 4,695,226
134 A 4,695,227
223 A 4,695,228
241 A 4,695,229

CLASS 417

218 4,695,230
241 4,695,231
410 4,695,232

CLASS 418

83 4,695,233

CLASS 420

129 4,695,427
561 4,695,428

CLASS 422

49 4,695,429
65 4,695,430
81 4,695,431
98 4,695,432
112 4,695,433
116 4,695,434
124 4,695,435

CLASS 423

135 4,695,436
239 4,695,437
4,695,438
263 4,695,439
328 4,695,440
347 4,695,441
359 4,695,442
443 4,695,443
569 4,695,444
635 4,695,445
648 R 4,695,446
659 4,695,447
4,695,448

CLASS 424

1.1 4,695,449
22 4,695,450
47 4,695,451
59 4,695,452
81 4,695,453
89 4,695,454
93 4,695,455
94 4,695,457
4,695,458
94.5 4,695,456
95 4,695,459
101 4,695,460
154 4,695,461
195.1 4,695,462
440 4,695,463
449 4,695,464
4,695,465
456 4,695,466
502 4,695,467

CLASS 425

23 4,695,234
29 4,695,235
131.1 4,695,236
135 4,695,237
145 4,695,238
194 4,695,239
207 4,695,240
275 4,695,241
376 R 4,695,242
388 4,695,243
429 4,695,244

CLASS 426

8 4,695,468
24 4,695,469
37 4,695,470
237 4,695,472
535 4,695,473
579 4,695,474
582 4,695,475

CLASS 427

6 4,695,476
68 4,695,477
71 4,695,478
96 4,695,481
4,695,482
244 4,695,483
245 4,695,484
256 4,695,485
282 4,695,486
294 4,695,487
385.5 4,695,488
438 4,695,489

CLASS 428

1 4,695,490
35 4,695,491
4,695,492
40 4,695,493
71 4,695,494
73 4,695,495
95 4,695,496
96 4,695,497
121 4,695,498
122 4,695,499
134 4,695,500
159 4,695,501
192 4,695,502
207 4,695,503
209 4,695,504
4,695,505
212 4,695,506
228 4,695,507
261 4,695,508
267 4,695,509
336 4,695,510
404 4,695,511
408 4,695,512
425.9 4,695,513
432 4,695,514
458 4,695,515
623 4,695,516
698 4,695,517

CLASS 429

12 4,695,518
52 4,695,519
116 4,695,520
194 4,695,521
206 4,695,522

CLASS 430

23 4,695,523
32 4,695,524
151 4,695,525
215 4,695,526
256 4,695,527
290 4,695,528
351 4,695,529
381 4,695,530
513 4,695,531
533 4,695,532
558 4,695,533
569 4,695,534
4,695,535

CLASS 431

9 4,695,245
31 4,695,246
352 4,695,247

CLASS 432

58 4,695,248
4,695,249

CLASS 433

5 4,695,250
8 4,695,251
73 4,695,252
136 4,695,253
213 4,695,254
215 4,695,255

CLASS 434

22 4,695,256
333 4,695,257

CLASS 435

1 4,695,536
5 4,695,537
7 4,695,538
10 4,695,539
4,695,540
18 4,695,541
68 4,695,542
70 4,695,543
119 4,695,544
4,695,545
172.3 4,695,546
173 4,695,547
179 4,695,548
194 4,695,550
267 4,695,549
292 4,695,551

CLASS 436

64 4,695,471
66 4,695,552
150 4,695,555
177 4,695,553
528 4,695,554

CLASS 437

31 4,695,328
34 4,694,565
40 4,694,563
4,694,564
48 4,694,566
52 4,694,561

CLASSIFICATION OF PATENTS

57 4,694,562
126 4,695,331
4,695,332
225 4,695,480
228 4,695,479

CLASS 439

59 4,695,108
67 4,695,258
76 4,695,115
83 4,695,106
4,695,107
95 4,695,105
155 4,695,109
188 4,695,116
4,695,117
266 4,695,111
271 4,695,259
289 4,695,110
350 4,695,112
404 4,695,113
573 4,695,114
726 4,695,118

CLASS 440

61 4,695,260
900 4,695,261

CLASS 446

236 4,695,262
256 4,695,263
321 4,695,264
329 4,695,265
454 4,695,266
462 4,695,267

CLASS 453

59 4,694,845

CLASS 455

33 4,696,051
51 4,696,052
67 4,696,053
89 4,696,054
118 4,696,055
182 4,696,056
226 4,696,057
277 4,696,058
600 4,696,059
601 4,696,060
609 4,696,061
612 4,696,062
4,696,063

CLASS 474

110 4,695,268
268 4,695,269

CLASS 494

34 4,695,270

CLASS 502

11 4,695,556
103 4,695,557
123 4,695,558
183 4,695,559
222 4,695,560
401 4,695,561

CLASS 514

13 4,695,562
105 4,695,563
127 4,695,564
206 4,695,565
234 4,695,566
253 4,695,567
258 4,695,568
4,695,569
261 4,695,570
275 4,695,571
278 4,695,572
290 4,695,573
313 4,695,574
322 4,695,575
330 4,695,576
362 4,695,577
397 4,695,578
4,695,579
412 4,695,580
415 4,695,581
423 4,695,582
449 4,695,583
456 4,695,584
469 4,695,585
4,695,586
510 4,695,587
538 4,695,588
653 4,695,589
724 4,695,590
781 4,695,591

CLASS 521

54 4,695,592
60 4,695,593
92 4,695,594
99 4,695,595
137 4,695,596
154 4,695,597

CLASS 523

400 4,695,598

CLASS 524

103 4,695,599
4,695,600
362 4,695,601
439 4,695,602
723 4,695,603

CLASS 525

28 4,695,604
109 4,695,605
160 4,695,606
272 4,695,607
308 4,695,608
352 4,695,609
426 4,695,610
432 4,695,611
433 4,695,612
533 4,695,613

CLASS 526

142 4,695,614
194 4,695,615
202 4,695,616

CLASS 528

32 4,695,617
55 4,695,618
73 4,695,619
204 4,695,620
483 4,695,621

CLASS 530

329 4,695,622
351 4,695,623
395 4,695,624

CLASS 540

63 4,695,625
214 4,695,626
224 4,695,627
312 4,695,628

CLASS 544

2 4,695,629
75 4,695,630
170 4,695,631
194 4,695,632
286 4,695,633
300 4,695,634

CLASS 546

69 4,695,635
116 4,695,636
207 4,695,637

CLASS 548

165 4,695,639

CLASS 549

226 4,695,640
552 4,695,641

CLASS 556

14 4,695,642
428 4,695,643

CLASS 558

249 4,695,644

CLASS 560

24 4,695,645
43 4,695,646
53 4,695,647
86 4,695,649
053 4,695,648
109 4,695,650
141 4,695,651

CLASS 564

343 4,695,652
505 4,695,653
510 4,695,654

CLASS 568

56 4,695,655
310 4,695,673
587 4,695,656
656 4,695,657
763 4,695,658
805 4,695,659
830 4,695,660
903 4,695,661

CLASS 585

324 4,695,662
417 4,695,663
440 4,695,664
450 4,695,665
481 4,695,666
4,695,667
500 4,695,668
511 4,695,669
533 4,695,670
858 4,695,671
867 4,695,672

CLASS 604

49 4,695,271
84 4,695,272
173 4,695,273
198 4,695,274
264 4,695,275
283 4,695,276
304 4,695,277
385 A 4,695,278
397 4,695,279

CLASS 623

1 4,695,280
11 4,695,281
22 4,695,282
23 4,695,283

CLASS 760

378 4,695,407

CLASSIFICATION OF DESIGNS

D1— 120 291,940
D2— 320 291,941
291,943
291,944
291,945
628 291,942
D3— 73 291,946
74 291,947
D6— 361 291,948
375 291,949
430 291,950
482 291,951
291,952
488 291,953
581 291,954
D7— 39 291,955
42 291,956
70 291,957
409 291,958
D8— 10 291,959
18 291,960
24 291,961
95 291,962
394 291,963
D9— 302 291,964
376 291,965
389 291,966
390 291,967
398 291,968
413 291,969
436 291,970
447 291,971
448 291,972
D10— 33 291,973
50 291,974
106 291,975
121 291,976
D11— 54 291,977
145 291,979
D12— 5 291,980
84 291,981
96 291,982
181 291,978
192 291,983
291,984
291,985
203 291,986
D13— 41 291,987
D14— 30 291,988
53 291,989
291,990
64 291,991
114 291,992
291,993
291,994
291,995
291,996
291,997
291,998
D15— 69 291,999
199 292,000
292,001
292,002
292,003
D16— 31 292,004
D18— 14 292,005
19 292,006
D19— 48 292,007
D20— 9 292,008
D21— 76 292,009
78 292,010
148 292,011
159 292,012
173 292,013
205 292,014
238 292,015
246 292,016
D23— 4 292,017
11 292,019
71 292,018
128 292,020
D24— 16 292,021
17 292,022
49 292,023
292,024
D25— 77 292,025
D26— 292,026
104 292,027
D27— 8 292,028
36 292,029
D28— 41 292,030
55 292,031
D30— 1 292,032
292,033
8 292,034
99 292,035
D34— 6 292,036
7 292,037
15 292,038
292,039

CLASSIFICATION OF PLANTS

P.— 68 6,017
6,018
6,019
6,020
6,021
6,022
6,023

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,694,728
4,695,120
4,695,200
4,695,388
4,695,428
4,695,880
4,695,881
04 : 4,694,752
4,695,006
4,695,123
4,695,496
4,695,590
4,695,923
4,695,951
05 : 4,694,712
4,694,991
06 : 4,694,511
4,694,514
4,694,518
4,694,543
4,694,544
4,694,554
4,694,565
4,694,566
4,694,570
4,694,583
4,694,586
4,694,606
4,694,615
4,694,619
4,694,621
4,694,657
4,694,667
4,694,668
4,694,691
4,694,694
4,694,708
4,694,729
4,694,746
4,694,770
4,694,772
4,694,777
4,694,778
4,694,779
4,694,787
4,694,802
4,694,811
4,694,822
4,694,824
4,694,826
4,694,846
4,694,848
4,694,852

4,694,860
4,694,861
4,694,906
4,694,935
4,694,956
4,694,967
4,694,973
4,694,975
4,694,981
4,695,014
4,695,022
4,695,024
4,695,025
4,695,026
4,695,029
4,695,041
4,695,049
4,695,067
4,695,070
4,695,072
4,695,088
4,695,118
4,695,139
4,695,189
4,695,201
4,695,212
4,695,213
4,695,218
4,695,221
4,695,222
4,695,227
4,695,229
4,695,231
4,695,262
4,695,273
4,695,274
4,695,291
4,695,293
4,695,296
4,695,314
4,695,327
4,695,335
4,695,348
4,695,365
4,695,366
4,695,368
4,695,373
4,695,375
4,695,382
4,695,391
4,695,394
4,695,401
4,695,455

4,695,459
4,695,462
4,695,472
4,695,486
4,695,495
4,695,499
4,695,542
4,695,547
4,695,595
4,695,618
4,695,619
4,695,623
4,695,655
4,695,673
4,695,676
4,695,703
4,695,712
4,695,713
4,695,715
4,695,722
4,695,733
4,695,737
4,695,740
4,695,743
4,695,749
4,695,772
4,695,773
4,695,788
4,695,790
4,695,794
4,695,801
4,695,827
4,695,831
4,695,870
4,695,873
4,695,876
4,695,887
4,695,888
4,695,891
4,695,901
4,695,903
4,695,911
4,695,917
4,695,929
4,695,953
4,695,982
4,696,062
4,696,063
4,558,179
08 : 4,694,584
4,694,609
4,694,781
4,694,904

4,694,943
4,695,073
4,695,257
4,695,290
4,695,385
4,695,448
4,695,650
4,695,719
4,695,823
4,695,920
4,695,994
09 : 4,694,519
4,694,599
4,694,631
4,694,632
4,694,738
4,694,831
4,694,982
4,695,030
4,695,087
4,695,157
4,695,226
4,695,267
4,695,340
4,695,341
4,695,429
4,695,449
4,695,452
4,695,518
4,695,541
4,695,553
4,695,571
4,695,596
4,695,626
4,695,634
4,695,705
4,695,736
4,695,829
4,695,854
4,695,952
4,696,019
10 : 4,694,987
4,695,310
4,695,311
4,695,602
4,695,607
11 : 4,695,028
12 : 4,694,513
4,694,545
4,694,552
4,694,595
4,694,596
4,694,602

4,694,717
4,694,753
4,694,816
4,694,828
4,694,874
4,694,974
4,694,980
4,694,996
4,695,020
4,695,085
4,695,106
4,695,110
4,695,114
4,695,146
4,695,183
4,695,275
4,695,379
4,695,386
4,695,387
4,695,424
4,695,550
4,695,577
4,695,582
4,695,718
4,695,810
4,696,017
4,696,032
4,696,045
4,696,051
4,696,052
13 : Re.32,506
4,694,534
4,694,535
4,694,620
4,694,659
4,694,858
4,695,494
15 : 4,694,524
16 : 4,694,742
17 : 4,694,532
4,694,581
4,694,601
4,694,686
4,694,718
4,694,790
4,694,804
4,694,818
4,694,869
4,694,872
4,694,905
4,694,928
4,694,947
4,694,955

4,694,958
4,694,960
4,694,962
4,694,979
4,695,016
4,695,035
4,695,053
4,695,096
4,695,115
4,695,116
4,695,117
4,695,127
4,695,142
4,695,198
4,695,199
4,695,254
4,695,261
4,695,302
4,695,376
4,695,420
4,695,483
4,695,492
4,695,523
4,695,560
4,695,601
4,695,662
4,695,665
4,695,666
4,695,728
4,695,761
4,695,771
4,695,776
4,695,918
4,695,924
4,695,977
4,696,000
4,696,016
4,696,027
4,696,028
4,696,036
18 : 4,694,553
4,694,600
4,694,661
4,694,819
4,694,847
4,694,857
4,694,925
4,695,061
4,695,207
4,695,352
4,695,417
4,695,447
4,695,545

4,696,026
19 : 4,694,536
4,694,590
4,694,648
4,694,780
4,694,870
4,694,900
4,695,038
4,695,071
4,695,195
20 : 4,694,695
4,694,912
4,695,083
4,695,339
21 : 4,694,932
4,695,255
4,695,693
4,695,886
4,695,948
22 : 4,694,547
4,694,768
4,695,357
4,695,436
4,695,461
4,695,958
4,439,311
4,504,383
23 : 4,694,557
4,694,950
24 : 4,694,672
4,694,774
4,694,992
4,695,107
4,695,171
4,695,344
4,695,543
4,695,561
4,695,694
4,695,757
4,695,845
4,695,892
25 : 4,694,589
4,694,766
4,694,775
4,695,054
4,695,103
4,695,121
4,695,130
4,695,138
4,695,220
4,695,351
4,695,392
4,695,393
4,695,456
4,695,470
4,695,505
4,695,580
4,695,683
4,695,747
4,695,752
4,695,766
4,695,806
4,695,837
4,695,861
4,695,921
4,695,930
4,695,959
4,695,968
4,696,031
26 : 4,694,550
4,694,559
4,694,576
4,694,591
4,694,618
4,694,646
4,694,660
4,694,676
4,694,701
4,694,703
4,694,705
4,694,706
4,694,733
4,694,834
4,694,880
4,694,881
4,694,882
4,694,923

4,694,939
4,694,941
4,694,946
4,694,953
4,694,966
4,695,084
4,695,090
4,695,112
4,695,182
4,695,185
4,695,230
4,695,253
4,695,295
4,695,342
4,695,343
4,695,408
4,695,433
4,695,464
4,695,501
4,695,621
4,695,669
4,695,682
4,695,685
4,695,711
4,695,859
4,695,942
4,696,044
27 : 4,694,528
4,694,594
4,694,682
4,694,684
4,694,687
4,694,823
4,694,934
4,695,003
4,695,160
4,695,176
4,695,251
4,695,258
4,695,453
4,695,519
4,695,536
4,695,608
4,695,697
4,695,782
4,695,850
4,695,954
29 : 4,694,629
4,694,876
4,694,911
4,694,988
4,694,989
4,695,057
4,695,241
4,695,410
4,695,469
4,695,611
4,695,825
4,695,933
30 : 4,694,506
4,695,186
4,695,350
31 : 4,695,686
32 : 4,694,531
4,695,371
33 : 4,695,055
4,695,664
4,695,943
34 : 4,694,549
4,694,561
4,694,568
4,694,677
4,694,685
4,694,747
4,694,758
4,694,760
4,694,763
4,694,839
4,694,968
4,694,990
4,695,099
4,695,126
4,695,204
4,695,211
4,695,240
4,695,282
4,695,316

4,695,331
4,695,332
4,695,334
4,695,336
4,695,364
4,695,402
4,695,404
4,695,431
4,695,434
4,695,435
4,695,463
4,695,473
4,695,474
4,695,490
4,695,500
4,695,521
4,695,544
4,695,564
4,695,565
4,695,573
4,695,579
4,695,585
4,695,586
4,695,588
4,695,624
4,695,637
4,695,658
4,695,744
4,695,762
4,695,784
4,695,791
4,695,817
4,695,868
4,695,878
4,695,879
4,695,922
4,695,969
4,696,053
35 : 4,695,321
4,695,677
4,695,695
36 : 4,694,509
4,694,641
4,694,650
4,694,663
4,694,678
4,694,732
4,694,769
4,694,827
4,694,907
4,694,954
4,694,959
4,694,972
4,695,023
4,695,081
4,695,082
4,695,104
4,695,109
4,695,113
4,695,152
4,695,177
4,695,192
4,695,196
4,695,224
4,695,285
4,695,286
4,695,287
4,695,288
4,695,292
4,695,294
4,695,362
4,695,400
4,695,443
4,695,454
4,695,471
4,695,489
4,695,503
4,695,522
4,695,524
4,695,526
4,695,532
4,695,534
4,695,535
4,695,538
4,695,548
4,695,583
4,695,589

4,695,594
4,695,612
4,695,688
4,695,702
4,695,709
4,695,716
4,695,723
4,695,735
4,695,755
4,695,760
4,695,769
4,695,793
4,695,799
4,695,832
4,695,838
4,695,874
4,695,884
4,695,902
4,695,934
4,695,950
4,695,975
4,695,987
4,695,999
4,696,003
4,696,046
37 : 4,694,515
4,694,538
4,694,558
4,694,582
4,694,636
4,694,820
4,695,018
4,695,100
4,695,128
4,695,507
4,695,554
4,695,555
4,695,570
4,695,742
4,695,805
39 : Re.32,508
4,694,580
4,694,598
4,694,624
4,694,634
4,694,638
4,694,652
4,694,675
4,694,713
4,694,722
4,694,725
4,694,731
4,694,757
4,694,837
4,694,843
4,694,845
4,694,863
4,694,877
4,694,951
4,694,961
4,694,965
4,694,970
4,695,012
4,695,031
4,695,208
4,695,250
4,695,269
4,695,271
4,695,278
4,695,390
4,695,422
4,695,493
4,695,605
4,695,668
4,695,674
4,695,680
4,695,701
4,695,721
4,695,738
4,695,759
4,695,768
4,695,800
4,695,836
40 : 4,694,625
4,694,692
4,694,750
4,694,788

4,694,829
4,694,903
4,694,936
4,695,009
4,695,203
4,695,214
4,695,389
4,695,671
41 : 4,694,674
4,695,248
4,695,249
4,695,739
4,695,811
4,695,853
4,695,981
42 : 4,694,627
4,694,673
4,694,693
4,694,720
4,694,721
4,694,743
4,694,783
4,694,997
4,695,037
4,695,045
4,695,092
4,695,105
4,695,111
4,695,156
4,695,265
4,695,299
4,695,318
4,695,320
4,695,323
4,695,337
4,695,361
4,695,369
4,695,372
4,695,378
4,695,430
4,695,437
4,695,438
4,695,439
4,695,441
4,695,476
4,695,478
4,695,520
4,695,584
4,695,591
4,695,679
4,695,775
4,695,783
4,695,820
4,695,926
4,695,941
4,695,946
4,695,973
4,696,010
4,696,022
4,696,029
45 : 4,694,520
4,695,502
4,695,606
4,695,647
4,695,808
4,695,956
46 : 4,694,507
47 : 4,694,551
4,694,577
4,695,359
4,695,377
4,695,395
4,695,537
4,695,562
4,695,830
48 : 4,694,605
4,694,612
4,694,628
4,694,630
4,694,649
4,694,656
4,694,662
4,694,679
4,694,704
4,694,727
4,694,754
4,694,838

4,694,855
4,694,859
4,694,878
4,694,890
4,694,901
4,694,908
4,694,910
4,694,913
4,694,916
4,695,058
4,695,060
4,695,161
4,695,163
4,695,164
4,695,184
4,695,197
4,695,205
4,695,217
4,695,246
4,695,303
4,695,367
4,695,399
4,695,482
4,695,672
4,695,700
4,695,779
4,695,840
4,695,848
4,695,872
4,695,883
4,695,945
4,695,949
4,695,962
4,695,970
4,695,979
4,695,984
4,696,012
4,696,034
4,696,038
4,696,039
4,696,040
4,696,042
4,696,047
49 : 4,694,569
4,694,918
4,696,061
50 : 4,694,899
51 : 4,694,773
4,695,460
4,695,497
4,695,509
4,695,610
4,695,803
4,696,005
52 : 4,694,608
53 : 4,694,516
4,694,572
4,694,998
4,695,010
4,695,019
4,695,050
4,695,051
4,695,056
4,695,194
4,695,264
4,695,986
54 : 4,695,324
55 : 4,694,510
4,694,523
4,694,541
4,694,546
4,694,575
4,694,603
4,694,616
4,694,792
4,694,812
4,694,835
4,694,921
4,694,971
4,694,978
4,695,005
4,695,216
4,695,604
4,695,704
4,695,727
56 : 4,695,039

DESIGN PATENTS

01 : 292,015
06 : 291,948
291,970
292,013
292,022
08 : 291,983
291,984
291,985
292,016
12 : 291,951
291,964

292,035
292,036
17 : 291,974
291,976
291,979
291,987
292,037
18 : 292,009
292,019
20 : 292,031
22 : 291,980

291,989
26 : 291,949
291,966
291,967
291,968
291,978
291,981
27 : 291,969
29 : 291,971
292,034
34 : 291,963

292,032
292,033
36 : 291,954
291,957
292,007
292,028
292,030
37 : 291,950
291,952
291,953

39 : 291,965
291,977
292,010
292,021
41 : 291,943
291,944
291,945
49 : 291,942
51 : 291,992
291,993

291,994
291,995
291,996
291,997
291,998
53 : 291,982
292,014
292,020
54 : 291,959
55 : 291,962

U.S. GOVERNMENT PRINTING OFFICE : O—1987

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402